RAILROAD GAZETTE

FRIDAY, AUGUST 19.

NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Elections.—Birmingham & Northwestern, T. M. R. Talcott, President.—Desha & Eureka Springs, George P. Bangs, President.—Kansas City & Sabine Pass, Harrison W. James, President.—Newport & New York Rapid Transit, Jesse Boynton, President.—Terre Haute & Indianapolis, W. R. McKeen.

New Companies Organized.—Atchison belt files charter in Kansas.—Baltimore & Sparrow Point is incorporated in Maryland.—Birmingham & Northwestern is organized in Alabama.—Camak & Wadesboro obtains charter in Georgia.—Camden & Northwestern filed articles in Kansas.—Dayton & Tellico is incorporated in Tennessee.—Dupont, Macon & Florida is organized in Georgia.—East St. Louis Terminal files articles of incorporation.—Kansas City, Watkins & Gulf is incorporated in Louisiana.—Kansas City & Sabine Pass files articles in Missouri.—Kinderbook, Valatie & Stuyvesant is incorporated in New York.—Lake Geneva & State Line files articles in Wisconsin.—Leavenworth & Denver Short Line is organized in Kansas.—Lookout Mountain, Lulu Lake & Gadsden is incorporated in Tennessee.—Maryland & Little Tennessee is incorporated in Tennessee.—Omaha, Ness City & Mexico filed charter in Kansas.—Occidental Construction Co. is organized in Kansas.—Red River Construction Co. files articles in Illinois.—Rochester City & Brighton Terminal is incorporated in New York.—St. Joseph & Santa Fe files articles in Missouri.—St Paul, Alexandria, Jennings, Lake Arthur & Gulf is organized in Louisiana.—Winters & Ukiah is incorporated in California.—Indianapolis & Wabash Railway files articles in Indiana.

Changes and Extensions.—*Dakota:* St. Paul, Minneapolis & Manitoba begins work on a new line.—*Georgia:* Chattanooga, Rome & Columbus awards contract for building.—*Missouri:* Kansas City, St. Joseph & Council Bluffs will build from Kansas City to St. Joseph.—*Ohio:* Wheeling & Lake Erie is to be extended.—*Quebec:* Montreal & Lake Maskinonge begins work.—*Tennessee:* Nashville and Tuscaloosa locate extension. Tennessee Midland will survey new line.—*Virgina:* Lynchburg & Durham will begin building from Lynchburg.—*Wyoming:* Chicago & Northwestern begins tracklaying from Douglass, westward.

Leases and Sales.—Missouri Pacific assumes control of Denver, Memphis & Atlantic.—New York City & Northern is sold.

Traffic.—Anthracite coal shipments for the week ending Aug. 13 show an increase of 20,833 tons as compared with the corresponding period last year. Bituminous shows increase of 13.1 per cent. Cotton receipts, interior markets, for the week ending Aug. 12, show a decrease of 3.4 per cent. as compared with corresponding week last year; shipments show increase of 8.2 per cent.; seaport receipts show increase of 9.1 per cent.; exports a decrease of 3.3 per cent.; cotton in sight is less than at same date last year by 37.0 per cent.

Miscellaneous.—Mexican Central locomotive engineers go on strike.—Grand Southern will be placed in the hands of a Receiver.—New York & Boston Rapid Transit Co. shows signs of activity.

Contributions.

The Burton Stock Car.

BOSTON, July 16, 1887.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of July 8, 1887, I notice an editorial which commences, "The advantage in using special cars, such as the Burton stock car, which results from their being ill-adapted to the carrying of any freight except that for which they are built, is of considerable more consequence west of Chicago than on Eastern roads, and the Chicago, Burlington & Quincy, in meeting the case before the National Commission by the Burton company, scores a point upon it."

In view of the foregoing, I wish to make a little correction. Your article would lead one to believe that the Chicago, Burlington & Quincy Railroad had made a great point, viz.: that ordinary freight cannot be loaded or transported in the Burton stock car. We showed distinctly and clearly before the Commission that we can carry 34 per cent. more railroad ties in a Burton stock car than can be loaded in the ordinary stock car, such as is used by the railroads, and this question of transporting sleepers was the one most relied upon by the Chicago, Burlington & Quincy road.

Mr. Stone, the general manager of that system, swore that they had from 110 to 120 cars of sleepers per day over their road for west-bound points. All of these railroad ties can be carried in Burton stock cars with a great saving of car mileage to the railroads, as upon the showing before the Commission we proved clearly that we could load and carry 600 sleepers in a Burton stock car, while taking Mr. Stone's sworn statement for a basis only 400 can be loaded and shipped in one of their stock cars.

You say in your article, "The large traffic in lumber, salt, iron and other coarse freight from Chicago westward, however, gives the roads in that territory a profitable west-bound business, and they can with perfect fairness make an additional charge for an inconvenient car." May I ask, and with all fairness, if there is one of the above articles which are mentioned by you that cannot be safely and properly carried in a Burton stock car?

Can you tell me wherein the railroads make any excess charge for anything carried in a refrigerator car, over and above the rate which is charged for the ice carried? It is right that railroads should charge more for refrigerator cars, because they carry 3,000 or 4,000 pounds of ice, and if they did not charge for the ice carried, they would be discriminating against other cars of like capacity.

Again, a refrigerator car, when empty, weighs from 6,000 to 9,000 pounds more than an ordinary stock car, or a Burton stock car, and I know whereof I speak, as I have the weight of more than 20 refrigerator cars, which gives this result, and if the refrigerator car weighs eight tons more than a common car, it is certainly right that the roads should charge more for hauling it.

Mr. Editor, it seems to us that this is a question with two sides, and that our side of the question can be discussed with equal propriety, and that we are entitled to be heard in answer to your editorial of July 8.

We have studied this subject for about five years, and we think we know what we are talking about, and when the general manager of a great system like the Chicago, Burlington & Quincy road, states under oath that the Burton stock cars have been run over that system for four years, and that he never took the trouble to look at one for the purpose of ascertaining how it was constructed, until the 13th of June, 1887, we think he shows his ignorance in this respect when he makes exorbitant freight rates for hauling Burton stock cars, claiming falsely that they cannot be loaded with ordinary freight the same as any other stock car. This does not particularly apply to Mr. Stone, but it is so with the majority of the railroad managers of this country. They get their information second hand, sometimes correctly, and perhaps many times it comes to them through the mouths of several of their subordinates, and by the time it reaches the general manager, the original fact is very liable to be incorrectly stated.

Mr. Stone stated, in reply to an interrogatory of General Butler, that the reason he looked into the car on the 13th of June in order to see how it was constructed, was because we had made complaint against his road before the Inter-state Commerce Commission. He never before, it seems, considered the matter of sufficient importance to give it his personal attention, but as he was going to Washington to testify, he undoubtedly thought it proper that he personally examine the car, as he would probably be questioned about it.

I might write a great deal more upon this subject; but believing that I have written as much as you will care to give space, I beg your indulgence, and trust that you will give me a chance with my side of the question.

If any railroad company in this country will come out and make a fair and honest statement, we will meet it on any and every point so far as it concerns the matter in question.

GEO. D. BURTON.

The Chatsworth Disaster.

The worst railroad accident in the history of this country, in every respect except that no person suffered from fire, occurred about midnight of Wednesday, Aug. 10, between Chatsworth and Piper City, Ill., on the Toledo, Peoria & Western Railroad. An eastbound excursion train of sixteen cars and two engines, loaded with 600 passengers from Peoria and vicinity bound for Niagara Falls, was derailed at a short trestle bridge which had been weakened by fire, and as the result 85 persons were killed, 100 more seriously injured, and about 150 others sustained bruises and breaks from which there is no danger of their dying. The train was made up of engines 21 and 13, the former weighing 40 tons and the latter 35; one baggage car, the private car of the Superintendent of the road, followed in succession by three reclining-chair cars and five day cars. Six Pullman sleeping cars at the rear completed the train.

Several minor mishaps occurred to the train. First, the air brake stuck, and when the east side of the Illinois River was reached it was found that 45 minutes had been lost to start with. At Weston, 53 miles out, a draw-bar of one of the cars pulled out, and on account of the crowded condition of the train an extra car was taken on at Forrest, 12 miles beyond Weston. Time was also consumed in taking on large numbers of people at the principal stops, so that upon leaving Forrest the train was almost two hours late. From Forrest to within a mile west of Chatsworth the grade is ascending, about 30 ft. to the mile. The train left Chatsworth at 11.45 p. m. Eastward from that town the track is straight and the grade undulating, the general average being a decline. None of the grades exceed 25 ft. to the mile. At the foot of each of the three grades is a wooden trestle. The first is about 35 ft. long, the second about 20, and the third, where the accident occurred, was 16 ft. long and spanned a little slough or run in which there has been no water for months. These three bridges are about a mile apart, thus bringing the scene of the wreck about 3 miles east of Chatsworth.

According to the evidence of engineman Sutherland, who ran the forward engine, and his fireman, John Rogers, they saw a flickering fire when about 200 feet from the bridge. The fireman of engine 13 also saw the blaze, and jumped from his post in time to save his life, as did Rogers. The bridge sank underneath the forward engine, though the momentum of 35 miles an hour carried it over the gap; but its tender, together with the second engine and the first ten cars, were derailed and crushed into a confused and shapeless mass, the 13 vehicles occupying a space, lengthwise, of not over 200 or 300 ft.

The forward end of the foremost sleeper, the "Tunis," was right over the burning culvert when it came to a standstill. The flames, fed by the splintered bridge, licked the under portion of the car, and it was only after a stubborn fight that they were extinguished. There was little water at hand, and the survivors had to scrape up earth with their fingers as the principal means of subduing the fire. This done, engineer Sutherland mounted his engine, went to Piper City, two miles ahead, and gave the alarm. The fire bell was rung, the towns along the line of the road were notified by telegraph, and aid soon began to arrive from every direction. The wounded were taken to Chatsworth and Piper City, and the people of both these places worked nobly for their relief. Numerous dead bodies and some conscious but helpless persons were robbed of valuables during the total darkness and confusion that followed the crash, and one or more wounded persons committed suicide by blowing their brains out. The robberies led to a suspicion that the bridge had been purposely fired by the robbers, but no facts have yet been shown to justify this theory.

The officers of the road seem to have intended to take special precautions to insure the safe passage of this train, and the section master was ordered to go over the road "the last thing Wednesday night." This he did about 4:30 p. m. He had been burning road-side rubbish and grass within 40 rods of the bridge that day, and testifies that the dry grass in and around this opening had been dug out a few days previously. The weather had been excessively dry and hot for weeks. It is said that the last train previous to the excursion crossed the bridge at 3:30 p. m., an hour before the section master made his inspection, which seems quite conclusive evidence that the fire was not set by a passing engine, but must have caught from burning grass; though the brisk southwest wind, which it is said was blowing during the evening may have fanned into life a spark which had smouldered a long time. The locality is a lonesome one, there being no house near, but the fire was seen from Chatsworth during the evening.

Half a dozen competent judges of speed who were on the train estimate that the train was not running over 35 miles an hour when wrecked.

The road, it will be remembered, was formerly the Toledo, Peoria & Warsaw. It was sold under foreclosure and reorganized under the present name several years ago. It was then leased to the Wabash, St. Louis & Pacific, but the latter defaulted on the interest in 1884 and the road was again sold (in October, 1886,) and is now in the hands of the first-mortgage bondholders.

President Leonard says that since he has been running the road for the bondholders it has not even paid interest, but that every cent of the road's earnings has gone toward improving and strengthening it.

Transcontinental Tea Traffic.

Statistics reported from Yokahama, which ships most of its tea to New York, show, it is said, a large increase in shipments via Pacific Ocean and the Pacific roads and a corresponding decrease in those via the Suez Canal. The following figures are given, though they are so incomplete that no intelligent comparison can be made, except as regards New York alone; so far as that port is concerned the canal seems to have held its own this year as compared with 1886. The large gross increase, 35 per cent., seems remarkable.

The figures are for "the season:"

	1887.		1886.		Increase.	P.c
Total received in:						
U. S. & Canada.	18,418,448		17,053,221		1,365,227	8.0
Of this the Suez route brought	4,725,554	.....		.....	.....	....
Received at N. Y. (included in above):		P.c..		P.c.		
Via San Fran..	5,650,682	62.4	4,211,422	62.7	1,439,260	34.2
Via Suez.....	3,411,860	37.6	2,505,741	37.3	906,119	36.2

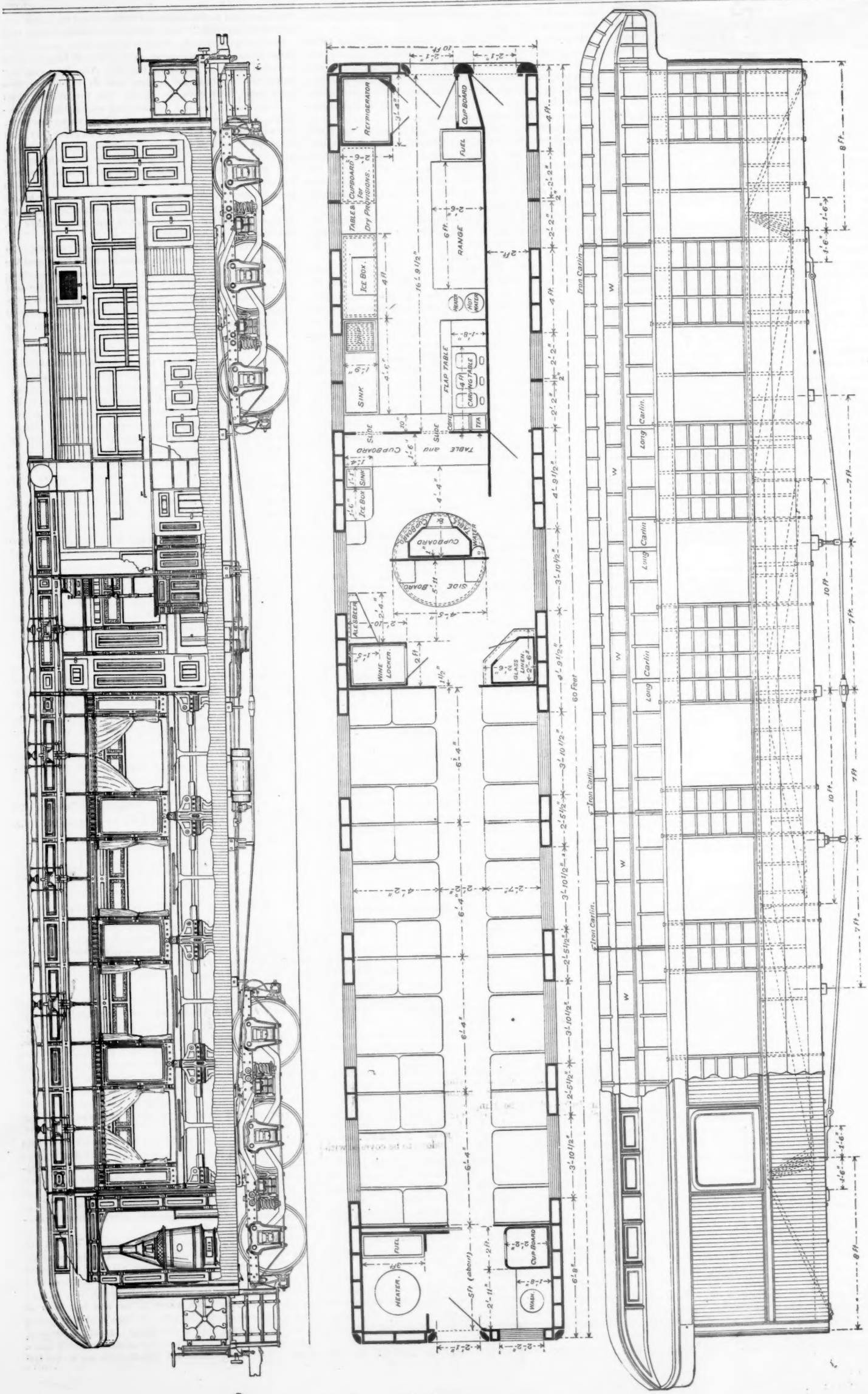
Dining Car, Michigan Central Railroad.

The accompanying illustrations represent a dining car recently built for the Michigan Central Railroad, which was one of the first roads to introduce this great addition to the comfort of a traveler on a long journey. The car contains many modifications and improvements on the earlier dining cars.

The kitchen has been increased in size and the number of seats reduced, and it is found that this change almost entirely prevents undue delay in serving, the kitchen being now fully equal to supply the limited number of diners seated. Dining cars were formerly made with four seats for each table, but it was found that it was difficult to seat so many at the necessarily small tables, and consequently the more modern cars have the aisle placed unsymmetrically, the tables on one side accommodating only two persons each, while the wider tables on the other side will comfortably seat four persons.

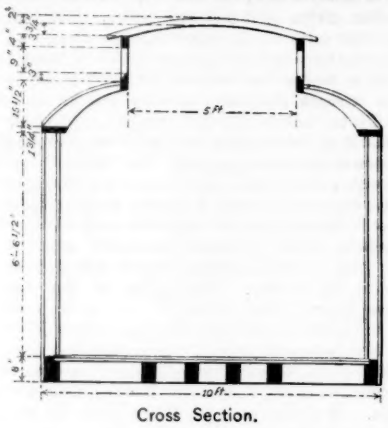
The serving table, placed in the room between the main dining room and the kitchen, is circular, and the waiters going from the kitchen pass on one side of it and those returning from the dining room pass on the other side. Thus the waiters do not incommode one another as in the old style cars with a rectangular table and one passage, where the two streams of waiters going in contrary directions occasioned considerable delay.

The greater width of the tables on one side enables the wine to be kept in the serving room instead at the end of the car. This obviates delay in fetching the wine, while under the arrangement shown the manager stands in the serving room and can receive the orders and issue the wine without leaving the serving room, where he has the best view of what is going on all over the car. An improved refrigerator of larger capacity is used and is found a great convenience. It has shelves and hooks for joints of meat in addition to the usual ice box. Dirty dishes are placed on the top of the lat-



DINING CAR, MICHIGAN CENTRAL RAILROAD.

ter, and the dirty water is liable to drop on anything placed inside. The refrigerator contains the ice at the top and is filled from the roof. Fig. 4 is a section of the refrigerator in plan, and shows the shelves and the hooks for joints of beef.



Cross Section.

The contents of either the shelves or the hooks can be removed without disturbing anything else.

The following table shows the principal dimensions of the car, as compared with the "Kansas City,"* a dining car on the Chicago, Burlington & Quincy. The tables of the latter can each seat four persons.

	Michigan Central.	Kansas City.
	ft. in.	ft. in.
Length of body	60 0	64 0
Width over sills	10 0	10 4
Length of kitchen inside	16 9½	16 5
Width " "	6 10	7 4⅞
Length of serving-room	13 9	10 0½
" dining-room	25 4	30 10
" wash-room	about 5 0	6 0½
Number of sections	four	five
Length each section	6 4	6 2
Size of tables	50 in. × 33 in. / 31 in. × 33 in.	40 in. × 31 in. / ....
Number of persons seated	24	40
Weight empty, lbs	74,000	82,500
Cost complete	$12,000†	$11,620†

It may be observed that in the "Kansas City" the greater extreme width of the car is of great benefit, as a difference

Fig. 4.

of only four inches makes an appreciable gain in the elbow room, both for guests, waiters and cooks.

The following is a very complete specification of the car:

Specifications for the Construction of a Dining Car for the Michigan Central Railroad Co.

GENERAL STIPULATIONS.

To be constructed and finished in accordance with drawings and specifications under an inspector representing the railroad, and in correspondence with detail drawings, templates and sample castings, and other samples which may be furnished. Reference will be had to the drawings as to dimensions, sizes, and so on, and said drawings, together with such writings, figures and details as may be on them, are to be considered a part of and illustrating the specifications. No deviations whatever will be allowed from the drawings or specifications except by permission of the master car-builder of the railroad; but it is hereby expressly provided that no advantage can be taken of the incompleteness or imperfections of drawings or specifications; and finally, the car must be constructed, equipped and finished to the entire satisfaction of the inspector before mentioned, otherwise it will be rejected; and, should the inspector object to any portion of the work or material used in the construction, and the inspector and contractor fail to come to an agreement, the matter is to be referred to the master car-builder of the railroad for his decision, and his decision shall be final.

Patent Rights.

The contractor must in all cases protect the railroad from all patent right claims.

Quality of Work.

The material used in the construction must be the best of their kinds and free from all defects, and all parts of the work must be done in the very best workmanlike manner.

Samples and Detail Drawings.

The railroad will furnish the contractor the necessary additional drawings, if necessary, also templates and samples; samples to be charged to the contractor at cost price.

Timber.

The end-sills must be constructed as shown on drawings, stiffened by iron plate and additional oak plank on inside, bolted together. End sills and platform timbers will be oak, longitudinal sills Southern pine, corner and door posts ash and intermediate posts Southern pine. The side braces and girts are to be made of ash, the frieze-board will be white wood, carlins to be ash, those adjoining iron carlins to be bolted to the same. The upper and lower deck-plates are to be pine. All of the timber must be of the best quality, seasoned and free from defects.

Framing.

The longitudinal sills must be framed into the inner timbers, which are bolted to end sills as shown, with two tenons 2 in. long and secured with ¾ in. joint-bolts. All tenons must be made to fit the mortise snug and true, and must be covered with white lead before putting same together. The top of floor timbers must also be covered with paint before the floor is laid or the ceiling is put over. All other framing must be done in the usual and best workmanlike manner.

Transoms.

Double transoms to be provided, as shown on drawing, made of ¾ in. × 6 in. wrought-iron, ends of upper plates to be turned over and welded.

Roof.

Lower and upper deck roofs to be covered with ¾ in. matched white pine ceiling, 3 in. wide. This boarding to be dry and free from all defects, and to be either screwed to carlins or fastened securely with 1¼ in. No. 10 barbed wire nails.

Outside Covering.

Outside covering to be ⅝ in. × 2 in. strips of whitewood matched and finished with round corners, as per sketch; joints to be laid in white lead, and ceiling to be nailed and glued to girts.

Platform.

The car must be equipped with the Miller platform, with gates, coupler and buffer complete, the coupling hook or bar to be wrought iron; each car to be provided with two coupling pins, same to be chained to car. All this work must correspond exactly with the standard on M. C. Railroad, according to drawings or templates, which will be furnished if required.

Draw and Buffer Springs.

The draw and buffer springs are to be 5½ in. by 8 in. round bar spiral springs, of approved manufacture.

Steps.

Steps to be in correspondence with the M. C. standard, as per detail drawing, if required, with galvanized iron side-plates.

Brakes.

The car is to be equipped with the Westinghouse automatic brake, of the usual pattern, as used on the railroad, brake-beams to be hickory, or elm (rock-elm).

Tinning Outside.

Roof to be covered with 20 in. × 28 in. one cross bright tin locked and soldered; seams to be well nailed before the next sheet is laid; the edge of lock to be protected by loading the seam with solder; the tin must be well nailed at lower edge over cornice; tin to be turned up against hurricane deck 1 in.; this to be covered by a copper strip 14 oz., top part of copper to turn over bevel-face of plate and then to bend up under and behind sash. The outside part of iron carlins must be covered with 14 oz. copper, lapping over posts ¾ in.

Canopies.

Canopies under ends of roof to be made of galvanized iron No. 18, wired with ⅝ in. rods. Steps to be protected on both sides with No. 20 galvanized iron, according to M. C. style.

Floor.

Floor to be made of double ⅞ in. boarding, lower boards to be common matched pine, then building paper must be put over this, and the upper boarding under the seats must be good, sound and well seasoned Norway pine, and in the aisle the best quality of dry ash, cut quartering, both 2½ in. wide, and free from all defects; all to be tongued and grooved and nailed down thoroughly. Under side of sills to be ceiled.

Inside Finish.

To be oak and burl ash similar to drawings. Each panel in dining room to be set with French plate mirror. All to be first-class and equal to best finish in modern cars.

Tables and Seats.

Tables and seats to be provided for eight sections as shown on ground plans. Seats to be leather covered, folding seats, same as furnished the railroad complete, by A. H. Andrews & Co., Chicago. Eight dining tables to be made of bay-wood.

All windows, except passage and kitchen windows, to be provided with suitable curtains and lambrequins. *Windows* at wash-stand to have blinds.

Head lining to be of oak veneer, suitably broken up in sections, according to design, with reference to the distribution of lamps.

Window Glazing

Windows are to be glazed with French plate glass ¼ in. thick, except in kitchen, which may be double thick American glass. Upper half on inside sash in body of car to be glazed with art glass of approved pattern. Deck sash, except in kitchen, to be glazed with three plates of art glass each as agreed upon.

Trimmings.

All necessary trimmings to be bronze of best quality; bronze coach door locks for outside doors, bronze butts, bronze plates and bolts for sliding sash in end doors, bronze pull for deck sash. Neatly designed sash locks, sash lifts, and coat and hat hooks. All lockers and cupboards to be provided with good Yale locks and necessary drawer pulls. Door holders to be cast brass. Catch set in floor and springs set in bottom of batten in door. Bronze bell cord hangers and bell cord bushings.

Lamps.

Car to be provided with six double chandelier lamps, with Argand burners and porcelain shades, made by Adams, Westlake & Co., Chicago; five bracket lamps, two in kitchen, two in pantry, and one in passage. Lamp in passage to be boxed.

Lavatory.

End of car opposite heater to be provided with lavatory, having marble top stand, wash basin, soap dish and good pump with tank underneath, to be made of galvanized iron, 25 in. long, 14½ in. wide, and 19⅜ in. high.

Wine lockers, closets, ice-boxes, side-board, refrigerator, shelving, etc., as per detail drawings.

Ventilation.

All deck sash to be hung with the Morgan Deck Sash Ratchet. Ventilation to be provided for through the ends, also by means of swinging panel. Kitchen to be ventilated through roof by three ventilating jacks. Deck sash opening under end projection, and kitchen windows to be covered with brass wire screens.

All panels in sides of car to be ventilated through roof.

Heater.

The car to be heated with Peter Smith heater furnished with reservoir, pump and pop valve as in general use on the railroad. All piping to be extra heavy steam pipe 1¼ in. diameter, and extra heavy steam pipe fittings are to be used.

Coal Box.

Coal box to have hinged cover 14 in. wide, 28 in. high, with substantial bank. To be made of No. 20 galvanized iron, length governed by space.

Trimmings for Heater.

Smoke jacks to be M. C. style, body and top of jack to be No. 20 galvanized iron; rest of jack to be No. 22 galvanized iron. A 15 in. spur collar is to be provided for finish of stove pipe inside. Entire heater room to be lined with zinc or galvanized iron on frame.

Window Sash.

Window sash to be made of cherry 1⅛ in. thick. Outside doors to be oak 1¾ in. thick, with sliding sash. Threshold for outside doors to be cast-iron, with shoulders to lap over bottom of door posts as standard on the railroad.

Kitchen.

Kitchen to be provided with one Wilkes range 6 ft. long, 23 in. wide, and 5 ft. 10 in. high, with carving table, dummy heater, reservoirs, tea and coffee heating arrangements, and piping complete as furnished and put up for the railroad by Wilkes, of Chicago. Upright reservoir to be 3 ft. high by 12 in. diameter. Roof reservoir to be 13 ft. long by 14 in. diameter, supported by iron brackets. One reservoir for drinking water 4 ft. long by 12 in. diameter, all of copper. Long reservoir to be provided with a sweat pan made of No. 26 galvanized iron.

Partition back of range protected by coverings as follows made of No. 26 galvanized iron:

1st lining fastened on the partition full length of kitchen.

2d lining put on with 1 in. cast iron nipples behind range only.

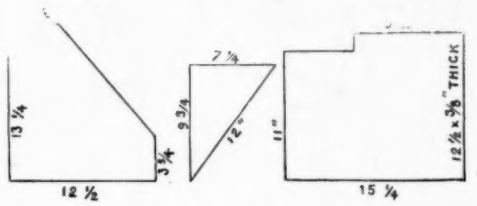
3d lining, same as 2d.

4th lining is asbestos 34 in. wide, 7 ft. 5 in. high, centre of range.

5th lining is on the asbestos, 30 in. wide by 7 ft. high, made of No. 26 galvanized iron. Range to stand 4 in. from wood partition. Range, dummy heater, carving table, cast iron sink, ice-box and chopping table to stand on platform 1 in. high from floor.

Floor and platforms to be covered with No. 22 galvanized iron. Over this will be placed an iron floor set in cement, plates resting on wrought-iron strips 1 in. × ⅛ in. and 2 in. × ¼ in., screwed to the floor 8 in. apart. Size of cast-iron floor, 31 in. wide by 15 ft. 9 in. long.

Sizes of plates for floor, 26 pieces, ⅜ in. × 12½ in. × 13¼ in.
" " " " " 3 " ⅜ " × 12½ " × 9½ "
" " " " " 2 " ⅜ " × 12½ " × 13¼ "



Kitchen to have one cast-iron sink 18 in. × 4 ft. 4 in. × 8¾ in. deep, inside measure, with drip made of 1½ in. gas pipe. Pantry to have one cast-iron sink 12 in. × 14 in. × 9 in. deep, inside measure, with drip made of 1½-in. gas pipe. Pantry to have another sink 13 in. × 15½ in. × 12½ in. deep, inside measure, this sink to have one round corner and cover so that it can be used as an ice box; drip 1 in. diameter. All drip pipes running through floor to be received into a malleable iron drip pipe at bottom. Sinks to have flanges all around to support them. Slop hole in floor of kitchen 6 in. × 6 in. Drip pipes in ice boxes 1 in. diameter, copper Wilkes patent smoke jacks on range. Three ventilating jacks on kitchen 9 in. diameter with revolving tops.

Size of carving table on top over all. 20 in. × 4 ft. Receiving table in pantry to be covered with galvanized iron, No. 24, with copper turned up against wood work 1 in. high. Receiving table to have two drips, one under coffee and one under tea faucet. Top of cast-iron sinks, ice-boxes, chopping table and splash board to be covered with galvanized iron No. 24. Ice-boxes in kitchen lined with galvanized iron No. 22. Wine locker and bottom of linen closet to be lined with galvanized iron No. 26.

Brake-shoes.

The brake beams to be provided with cast-iron heads, M. C. style, and adjustable brake-shoes of the style known as the Christie brake-shoe.

Trucks.

Trucks to be the standard M. C. six 42-in. wheel trucks, as shown on drawing. The wheels to be used shall be the Allen paper wheels, of 42-in. diameter. All parts of trucks to conform strictly with drawings and detail drawings if required. The equalizer springs are to be 8 × 10 round bar spiral springs of approved manufacture. The bolster springs to be double elliptic. Oil-boxes to be provided with the Hewitt lid.

Bolster and Spring Plank.

To be made of the best quality of seasoned white oak. The axles must be hammered fagot axles, made from the best refined scrap iron. They must be turned accurately to the template furnished; the wheel seats must be turned smooth, with a fine feed, and shoulder back of wheel seat turned completely off, with a gradual taper.

Axles.

The axles to be the M. C. B. standard, 3¾ in. × 7 in. journal, and the M. C. style, 5 in. diameter inside of hub of wheel and 4¾ in. diameter in center, with gradual taper, and not hollowed out. Bearings to be the Hewitt patent solid bearings with soft metal linings manufactured by the Hewitt Mfg. Co., Chicago.

Wrought Iron.

All the wrought iron used in the construction of this car, except as otherwise provided for, must be of the best quality Lake Superior or extra refined No. 1 scrap iron. It must be wrought in the best workmanlike manner and must be free from all defects. All bolts, rods, etc., must measure full up to the gauge.

Bolt-heads and Threads.

The gauge of all the screw-threads and nuts must conform strictly to the standard adopted by the M. C. B.'s convention at Richmond.

Castings.

All castings to be of the M. C. style. Contractor can get his castings cast from the M. C. foundries in Detroit, where they are in use.

Painting.

The outside of the car to be primed, properly filling every crevice and nail hole. The wood work then to receive one coat of white lead mixed with raw linseed oil, japan, gold size and turpentine, after which it is to be puttied with hard putty. The second coat to be applied after the putty is thoroughly hard. Then the whole to be painted two more coats of the same paint, allowing ample time between coats to dry. Then to receive three coats of approved color, if necessary four coats, before striping, ornamenting or lettering, according to future instructions. And then to receive three coats of outside best wearing body varnish, Thresher manufacture. Outside of sash to be grained oak and varnished. Trucks and platforms to be painted three coats of approved shades, striped, and one coat of outside varnish. Hand rails and other iron usually painted black, to receive one coat of flat drop black and varnish. Tin roof to receive two coats of mineral paint and finish with one coat of approved color. All wood-work, sash and screens of hurricane deck to receive three coats of paint and varnish as body. Ceiling under car to receive one coat of mineral paint. Upper side of sills to receive one heavy coat of white lead before putting the same together. All hardwood on

* This car was illustrated very fully in the *Railroad Gazette*, Jan. 15, 1886. The trucks were illustrated in the issue of April 2, 1886.

† This cost includes that of dining-car equipment, glass, plate and linen in the Michigan Central car, but not in the "Kansas City."

outside of car, as door and corner posts, to be properly filled before painting.

Floor to be properly cleaned and oiled.

All piping for heater to be bronzed. Head lining to be painted and ornamented as directed.

Letters and Numbers.

Letters and numbers on inside of car as will be directed. Design or description for lettering and numbering on outside will be furnished. The letters on the signboard must be metal, as in use on the railroad.

Inside finish of car to be properly filled, shellaced and sandpapered; then to be covered with three coats of best inside varnish; the entire surface to be then rubbed and oiled.

The Could-Tisdale Signal.

This signal is the result of an attempt to invent an electric signal which should be operated directly by the current without the intervention of clockwork or any other mechanical device; be so simple that derangement would be very unlikely to occur, and be readily located and remedied when it did happen; and preserve the semaphore form of signal, which, other things being equal, is undoubtedly the best.

This is intended to serve the purpose of a line block signal, a station block, or a special signal, as may be desired, though it has as yet been used only as a station block. The instrument is set on a post about 10 ft. high, and consists of an iron box containing an electro-magnet and armature; on the top of the box is mounted an iron ring about 3 ft. in diameter, set with two plates of glass, between which is fixed a semaphore arm pivoted at the middle, so as to move in a vertical plane through an angle of about 45 degrees. The arm is set at right angles to the track in full view of an approaching train, and one end is slightly overbalanced, so that when no current is passing the weight of this heavier portion brings the arm to a horizontal position. On the other side of the centre a small rod connected with the arm is attached to one end of a lever, the other end of which is so connected to the armature of the electro-magnet that a small motion of the armature is sufficient to change the signal from the horizontal, or "stop" position, to the "all clear" position. Behind one end of the arm (which has an opening covered with red glass) is fixed a bull's-eye lantern.

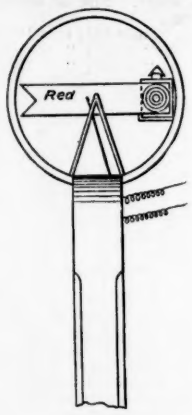


FIG. 1.
AT "DANGER".

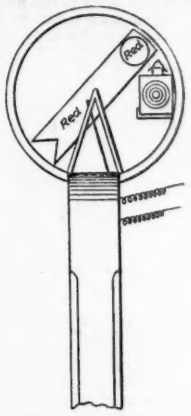


FIG. 2.
"ALL-CLEAR."

When the signal is in the "all-clear" position it shows a white light for the night signal; if the signal be in the stop position it covers the light and causes it to show red. The signal is held clear by the constant passage of the current through the electro-magnet in the iron box. As a line block signal, it is to be so connected with a single rail that a passing train will momentarily break the circuit and set the signal to the "stop" position. The apparatus is so arranged that this circuit remains broken till the train reaches the end of the section, when it makes contact with another circuit breaker which sets the signal "clear." It can be so connected with any number of switches that the moving of either one of them off the main line will set the signal. As a line block signal it is in principle merely a substitute for the Hall signal, without the track instruments. It does not show broken rails or parts of trains left in the section.

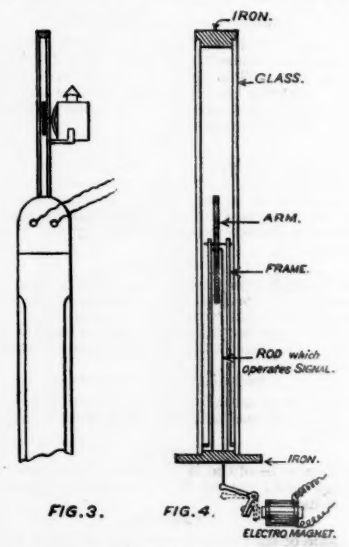


FIG. 3. FIG. 4.

SECTION.

During the last few months fourteen of these signals have been put on the Boston & Maine as station signals, each of which is connected with a key in the Agent's office. Should it be desired to hold back a train about to enter the station operating the key breaks the circuit, the signal falls to the horizontal position, and the train stops. An indicator in the station shows in which position the signal is set. Any derangement of the wire circuit or failure of the battery should keep the signal at "danger" until the cause is removed.

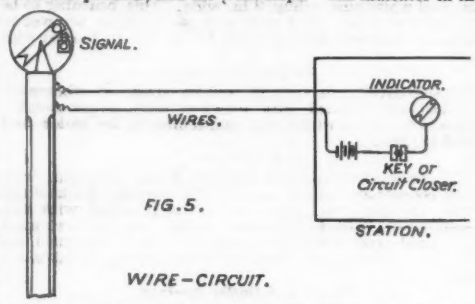


FIG. 5.

WIRE-CIRCUIT.

This signal has been in use too short a time to speak from experience of its merits, but for use simply as a station signal (the only purpose for which it has yet had a practical trial), it would seem to be a simple and inexpensive device for signaling an approaching train not to enter the station. The officials of the Boston & Maine speak favorably of its working thus far, and it is intended to put up several more of the same kind. It is possible that some line block signals will also be put up to give this instrument a trial.

In the illustrations it will be observed that the enlarged section is not drawn to scale; its height is about three times greater in proportion to the thickness than appears in the cut. In fig. 5, it will be understood that the wires, which are shown short, represent a line of any desired length.

The Dowling Coupler

The Dowling coupler, as shown in the illustrations, is materially changed from the design given in the *Railroad Gazette*, Oct. 2, 1885. It will be seen that the head has been made heavier in the outer wing or guard arm and broader. The form of the knuckle is changed in the greater curve and length given to the stem, which slides in the head. The spring to open the knuckle has been abandoned, and it is now opened by hand by a chain. The device for lifting the locking pin has also been added, and changes have been made in the form of the draw-bar. Most of these changes have been the results of experiment and actual service. The guard arm was found to be too weak. The change in shape of the knuckle gives a greater surface to take shocks and the working pull. The discontinuance of the spring gets rid of one part, and that a delicate one. A more important reason for abandoning it may have been found in the fact that in attempting to couple it at speed the spring would open the knuckle before the locking pin could fall and cars would remain uncoupled. But there is a loss in convenience as compared with a knuckle that opens automatically, either by a spring or by gravity. The lever for lifting the locking pin is certainly a great gain. The proportions and dimensions of the Dowling are doubtless more satisfactory now than they could have been if any considerable number of the earlier model had been put in use.

The whole apparatus is so simple and so completely shown in the cuts that description is hardly necessary. Fig. 1 gives a perspective view of the coupler as applied. Fig. 2 is a plan of the draw-head and knuckle. Figs. 3 and 4 are sections of the draw-head and draw-bar. Figs. 5 and 6 are plan and elevation of the knuckle, and fig. 7 shows the locking pin.

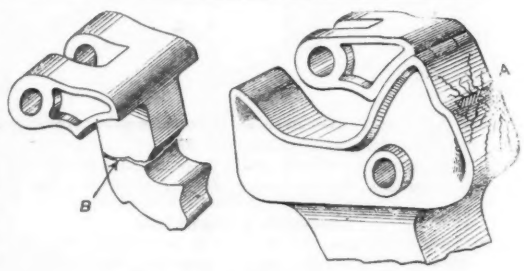
The knuckle or hook is not pivoted to the draw-head, but is held by the curved stem, moving in a socket in the draw-head. By this arrangement the shocks and wear are taken by large bearing surfaces, and one part, the pin, is got rid of. The hook moves to and from the draw-head in coupling and uncoupling, giving quick and free action. The hinge common to other vertical plain couplers is done away with.

Those who have lately been most active in study and experiment to improve the details of the Dowling coupler, think that in strength, simplicity, economy and all around efficiency it is the best freight car coupler yet devised. They have used it on yard engines with both knuckles closed, as a severe practical test for strength. They claim to be able to couple with a Janney passenger coupler on a 20-degree curve, and have even done so with a Janney freight coupler. The decrease in the radius on the inside the of point of the hook was made to secure it against uncoupling on a 28-degree curve. This is accomplished without affecting its coupling with the Janney. The spread of the draw-head and the square form given to it is a change designed to further protect the car from injury in case the buffer-brace above is broken. Some pains was taken to reduce the spaces between running-boards in coupled cars, the distance being 3½ in. less with Dowling than with Janney couplers. It should be noticed that there are no exposed cavities to collect snow and ice.

So far the experience of the makers has been that the best results can be obtained by making the head of cast steel and the knuckle of wrought iron. As now made, the casting weighs 117 lbs., the knuckle 51 lbs., and the pin 7. It is intended, however, to reduce the weight some 20 lbs. by proper coring. The coupler is now in use on cars and engines of the Pittsburgh, Cincinnati & St. Louis, and on cars of the St. Louis & San Francisco.

The following is a record of tests made at the Columbus, Ohio, shops a year ago:

Test	Kind of coupler.	Height of drop.	Weight of ball in pounds.....	Foot pounds expended.....	Remarks.
1	Engine "E."	5 ft.	1390	6,950.00	No sign of fracture to head or knuckle.
2	"	7 ft.	1390	9,738.27	
3	"	9 ft. 6 in.	1390	13,200 10	
4	"	12 ft. 9 in.	1390	17,567.22	
5	"	16 ft. 6 in.	1390	22,935.00	Broke at "A"; knuckle broke at "B."



Summary.—Total number of blows received by knuckle, 5; weight of ball, 1390; greatest height of fall, 16 ft. 6 in.; breaking resistance in foot tons, 11.46; total number of foot tons received by knuckle, 35.19.

NOTE.—The following formula, that of De Volson Wood, was used in calculating the force of blow: $F = \frac{w\,v^2}{64.4}$ when w = weight of ball, v = velocity acquired in falling.

The following is the prescribed test for steel knuckles. Material should have a tensile strength of not less than 70,000 pounds per square inch and 10 per cent. elongation in a two-inch section, casting to be made of what is known as mild steel.

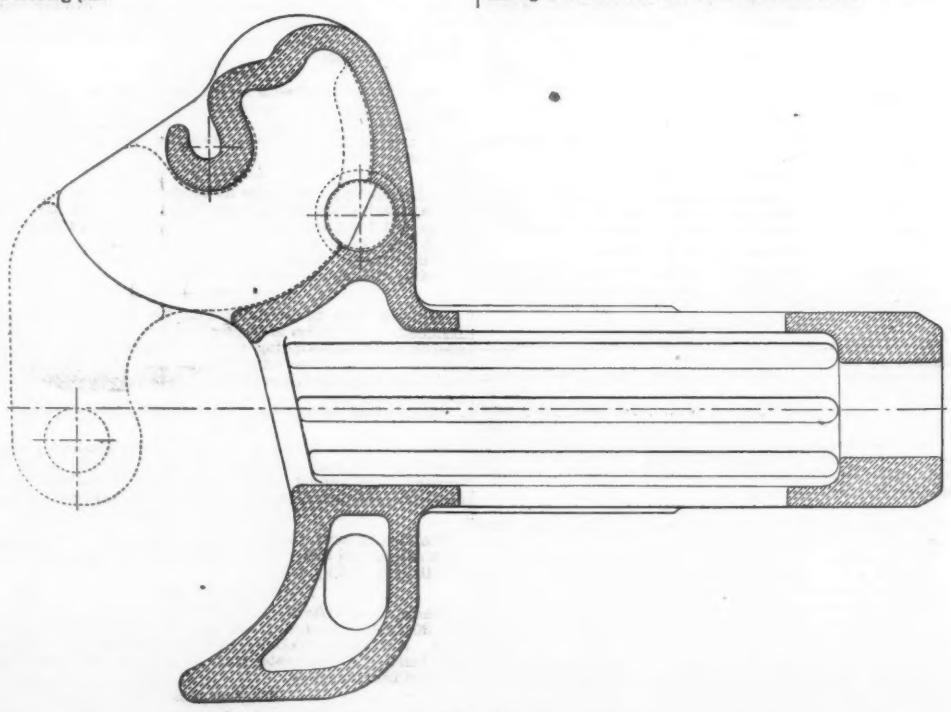


Fig. 4.

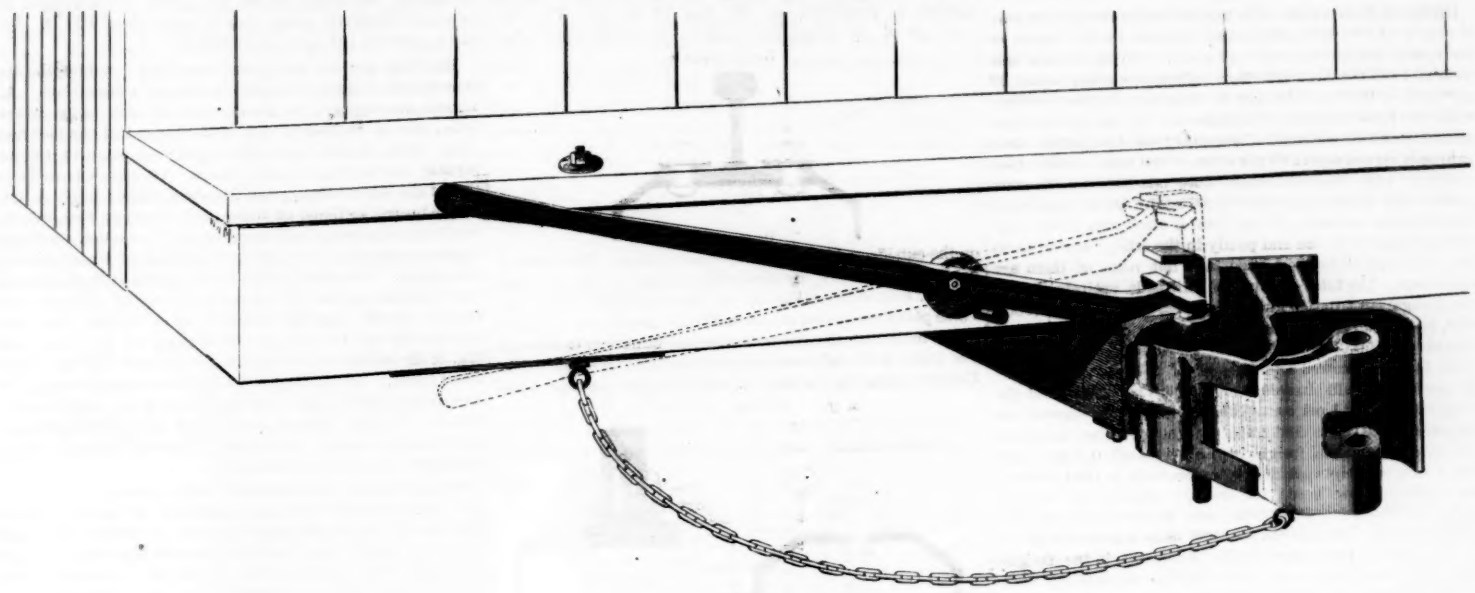


Fig. 1.

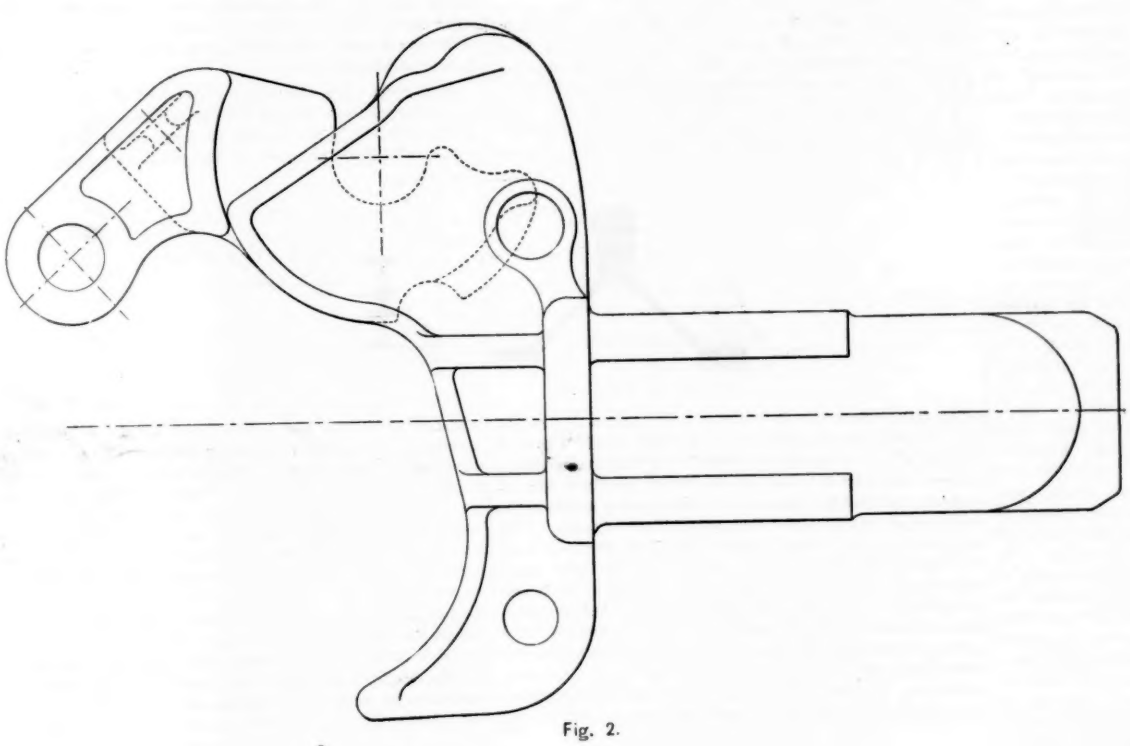


Fig. 2.

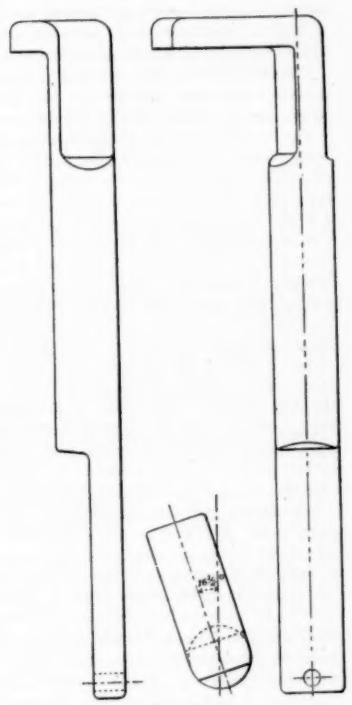


Fig. 7.

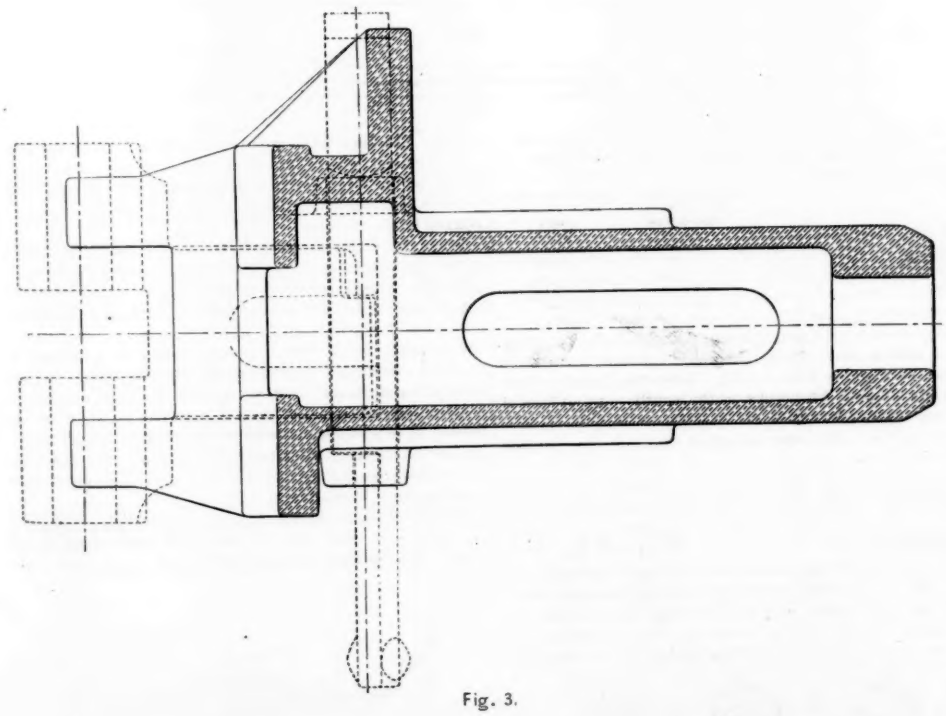


Fig. 3.

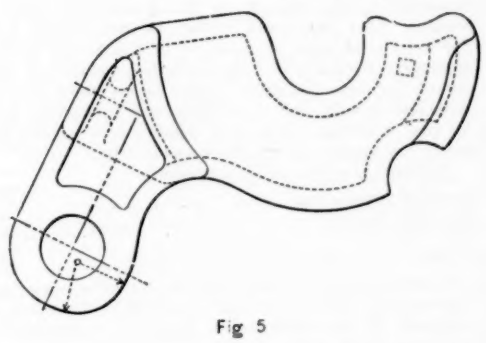


Fig 5

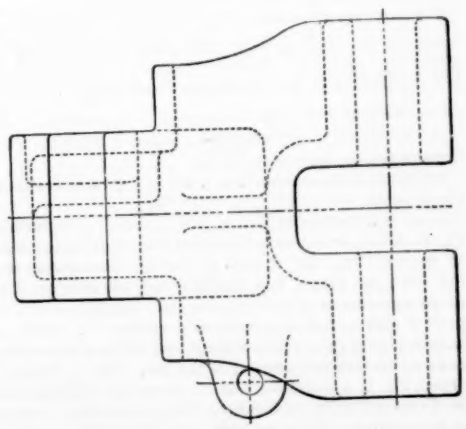


Fig. 6.

THE DOWLING FREIGHT-CAR COUPLER.

The Austrian-Hungarian Railroads.

GENERAL STATISTICS.—The total mileage at the present date is nearly 14,000 miles, the annual increase in the length of the system being comparatively small. During the first half year of 1886 the Austrian state railroads earned about 33 per cent. of the total earnings by railroads in the country, while the lines owned by companies and worked by the state earned about 40 per cent. of the total; the Hungarian state railroads earned about 80 per cent. of the total within that country, while the companies lines operated by the state earned only about 1 per cent. of the total. Of the total earnings for both countries 33 per cent. is attributed to the lines which lie partly in one and partly in the other; among these lines are some of the most important, but none of them are state lines. The total earnings of railroads entirely within the Hungarian frontier for the half year was about $7,730,000, and the largest amount earned by a private railroad was about $550,000. Taking the systems together the returns for 1885 showed a falling off of 3.1 per cent., while the passenger traffic had decreased by 4.8 per cent. and the freight traffic by 1 per cent. The gross receipts showed an increase of 0.3 per cent.; the passenger receipts increased 2.7 per cent. and the freight traffic decreased 0.4 per cent. The average receipts per mile were less than in 1884, though the latter year was noted for its low returns, the receipts being as follows: 1885, $3,313; 1884, $3,487; 1883, $3,650; 1882, $3,637. The returns for 1886 show a decrease of 7.5 per cent. in the passenger receipts, 5 per cent. in the freight and 6 per cent. in the total. The average receipts per mile were $3,111 (total, $43,098,242), 75 per cent. of which was from freight. During the first half of the year 26,577,427 passengers were carried and 33,001,411 tons of freight; the number of passengers was 1 per cent. more than in the previous year and the freight tonnage was 3.5 per cent. less.

CONSTRUCTION.—The railroad concessions granted to private companies provide for the transfer of the roads to the state at certain periods and under certain conditions.

The bridges must be designed for a train of locomotives with a load of 13 tons per axle, and to avoid accidents from derailing, the floor must be made of sufficient strength to support a load of 14,330 pounds. The imperial ordinance specifies the strains that may be allowed for the ironwork, but in the case of local lines of narrow gauge and in other exceptional cases, the act permits a reduction of these loads. Metallic bridges are tested by rolling and dead load, the former being made with trains drawn by two of the heaviest engines on the line at 9.3 miles per hour, and also at the maximum speed at which the trains will be worked. Provision is made in the railroad regulations for the protection from fire of adjacent buildings. With regard to the fencing the law requires that when a railroad occupies a road, bridge, etc., it must be securely fenced, also at road crossings, stations and other points where required. A general system of fencing is not enforced, and the companies are specially excused from placing fencing at water stations and other stations that are not used for the accommodation of passengers. For this reason even lines that are traversed by express trains are often only fenced at a few points. The Bureau of Administration has recommended the adoption of live hedges along the entire systems, to prevent access to the track, and that the lines be protected from snow and from obstruction or damage in case of floods by means of plantations on the slopes or on the space within the right of way; these plantations should be established during the construction of new lines, and gradually introduced on lines now in operation. Many of the level crossings are operated from a distance, the gates being of the lifting type, with counterweights. They are mostly worked mechanically, in some few exceptional cases by means of electricity, but in consequence of the delicacy of the mechanism, and the high first cost of the apparatus, electric gates do not seem likely to come into general use. Guard-rails may be dispensed with on level crossings only used by lightly loaded wagons, and are only obligatory on important road crossings.

The width at sub-grade on embankment is:

	Ft.
Width of ballast at top	11.5
Two slopes of ballast	4.4
Two side benches	3.0
Total	18.9

In cuts the width, not including the ditches, is, minus the side benches, 15.9 ft. On double track lines the width at sub-grade in cuts and fills is respectively 27.4 and 30.3 ft., not including the ditches.

For rock cuts the standard type for single track is:

	Ft.
Width between ditches at rail level (dwarf walls to retain ballast)	11.5
Two ditches, 1.6 ft.	3.3
Two side benches, .9 foot beyond the ditches	1.9
Total width at rail level	16.7

For double track this width is increased to 28.2 ft., which includes two ditches 1.6 ft. wide.

The gauge is the standard, 4 ft. 8½ in.; T rails are generally adopted.

Track laid with metal ties is only adopted exceptionally. The Hohenegger system has been tried on the Northwestern of Austria; and the Heindl system on the Austrian state railroads; the Serres and Battig system has been put down as an experiment on the Austrian state railroads, and it appears to give good results, especially at stations, where the maintenance of the track is difficult and where it is necessary to avoid too frequent renewal of the ties. The Hohenegger system (fig. 1), a modification of the well-known Hilf type, was used experimentally on the Northwestern in 1876; it consists of longitudinals 29.43 feet long, 11¾ in. and 6⅝ in. wide at bottom and top respectively, and 3 in. high; it weighs 58.75 lbs. per yard; the rails weigh 60 lbs. per yard and are attached to the longitudinals by means of bolts and angle washers clamping the flange of the rail and bearing against a projection on the top of the tie. The rails are spliced by strong splice plates, an angle splice plate

HOHENEGGER.

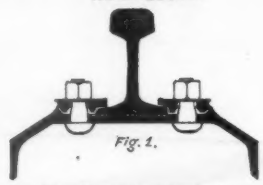


Fig. 1.

on the outside and the other of ordinary form. The joints of the longitudinal ties are secured by means of strong plates 16½ in. long, conforming to the interior shape of the tie. These plates are bolted at one end to an angle iron cross-tie, which maintains the gauge, and at the other end to the rail. The joints of the rails and longitudinals are coincident. The Heindl system (figs. 2 and 3), used on the Austrian state

HEINDL

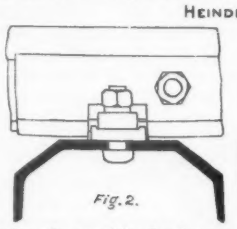


Fig. 2.

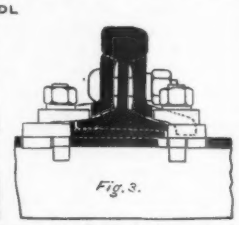


Fig. 3.

railroads, consists of a heavy cross-tie 7.87 ft. long, 10 in. and 6 in. wide at bottom and top respectively, and 4 in high; it has a uniform thickness of .4 in. and weighs 158.4 lbs. The inclination of the rail is obtained by means of a chair. This chair and the flange of the rail are attached to the tie by means of clamps bearing both on the rail flange and the chair. The Serres and Battig system of longitudinals (figs. 4 and 5), was adopted for certain sections of the Aus-

SERRES AND BATTIG.

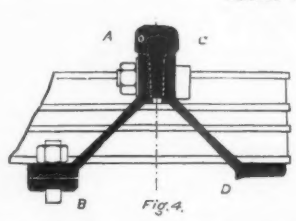


Fig. 4.

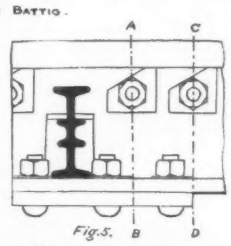


Fig. 5.

trian state railroads in 1877 and is still in use to a small extent. In this system a flangeless rail is used, and it is claimed that the weight of the rail is reduced to a minimum, that a perfect continuity is obtained with room provided for expansion, and that the track is such that passing loads tend to make it more stable rather than to put it out of order. The tie consists of two beams, between the cheeks of which is set the shallow web (2.22 in. deep) of the rail, the head being supported by flanges at the top of the beams. The beams and rail are kept together by means of strong saddle-chairs, placed in openings in the longitudinal beams. The weight of passing loads causes the upper jaws of the beams to grip the rail tightly, but bolts are used to make the construction quite firm. The beams are spliced by plates bolted beneath the lower flanges. The gauge is maintained by cross-ties formed by the continuation of the saddle chairs. The following is given as the cost per yard of track, as compared with the ordinary form of track:

	Ordinary type with wooden cross ties.	Serres & Battig type of metal track.
Rails	$3.36	$1 98
Ties	1 24	4.02
Fastenings	.72	.06
Ballast	1.30	.86
Laying	.36	.14
Total cost per yard	$7.08	$7 06

The general type of iron rail weighs about 72 lbs. per yard, and is 18.6 ft. long; the standard steel rail weighs about 66 lbs. per yard and is 29.5 ft. long. These are only the most generally adopted dimensions, as the lengths vary on lines of different companies and even on different sections of each company's line. The Austrian state railroads have the ten following types:

Iron.							
Weight per yard	39.6	42.8	66.0	71.4	72.6	75.0	74.4
Length in feet	18.14	18.66	18.66	18.66	18.66	19.68	22.79
Steel.							
Weight per yard				76.5	66.3	64.5	
Length in feet				22.79	29.52	22.79	

The handling of steel rails 29.52 ft. long, and weighing about 652.4 lbs., is facilitated by a specially designed lorry.

The old joint cross-ties are 8.2 ft. long, by 6 in. thick, 10 in. wide at top, and 11¾ in. at bottom. They are disappearing now as the insistent joints are giving way to suspended

Fig. 6.

joints. The ordinary cross-ties are 8.2 ft. long, .50 ft. thick, and of varying cross-sections (fig. 6). They are spaced 2.82 ft. apart. On sharp curves the gauge is maintained by means of transverse gauge-rods at intervals of 9.84 ft. Distance posts are put up at every 328 ft.

The lines are worked on the "open line" system, the distant signals standing normally to indicate a clear track. All signals are signaled on the line and at stations by electric bells; this is obligatory for both single and double-track lines. Most of the lines are single, only some of the important lines having a double track. On the Vienna-Pesth line of the Austro-Hungarian Society a double track is laid on the busiest sections; on these sections occur two narrow parts, one at a tunnel and the other at a viaduct, where the width at subgrade is not sufficient to allow of trains passing each other. The arrangement of the tracks at these points is very singular, instead of uniting the tracks by switches one track is, in one case (fig. 7), laid so as to reduce the space between the tracks to about 1.64 ft.; and in the other case (fig. 8) the inside rail of one track is between the rails of the other track. This arrangement, which avoids the chance of derailing or getting trains on the wrong track, might lead to collision if these narrow parts were not protected in both directions by distant signals, interlocked so that they cannot simultaneously indicate track clear.

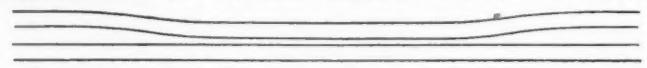


Fig. 7.

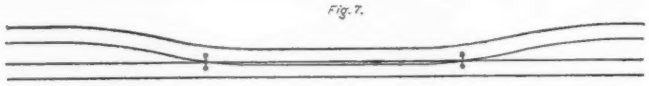


Fig. 8.

The stations are remarkable for their neatness, their good state of repair, and a general appearance of lightness due to the creepers and plants along the lower story, the flower beds which surround them, and the refreshment rooms on the platforms. The platforms are usually placed on a level with the top of the rails, and foot-bridges or subways to obviate the necessity of passengers crossing the tracks are unknown. At depots the switches are fitted with ground signals for day and night, and at junctions posts are placed to indicate how far a train may proceed without danger of being struck by a train passing on the other line.

OPERATION.—The speed is generally slow, the express trains not averaging more than 26.6 miles per hour, and ordinary trains only 18.6 to 21.75 miles per hour. This is partly on account of the requirements of the public and partly on account of the grades. On the line from Vienna to the Roumanian frontier, however, express trains attain a speed of 31 miles per hour, and on the line between the Austrian and Hungarian capitals, even 34.75 miles, including stoppages. On this line, however, the grades do not exceed 3 per 1,000, which allows the freight engines to haul as many as 70 cars, with a total load of 900 tons. The maximum running speeds permitted by the imperial ordinance are, for passenger trains, 46.5 miles per hour, and for freight trains 23 miles per hour. No passenger train must contain more than 100 axles, nor a freight train more than 200 axles; and every train is required to have sufficient brake power according to the grades and the weight of the train. In mixed trains the passenger cars are to be protected by means of freight cars in front and behind. Timber is never to be carried on passenger trains. The imperial regulations recommend that the locomotive should always be at the front of the train, that it should never be run tender first, and that there should never be more than one locomotive to a train. These rules may be relaxed in special cases.

When two trains are successively started out from a depot in the same direction, if the first is a freight and the second a passenger train, a period of fifteen minutes must elapse between their departure; ten minutes if both are passenger trains and five minutes if the first is a passenger and the second a freight train. There should always be a distance of 3,106 ft. maintained between trains when running. On the Southern and the state systems, as soon as a train has passed a signal station the signal man is required to place in the ballast, or in a socket provided for the purpose, a staff with a red disc at the end; this signal must be kept up for the regulation time after the passage of a train, and forms practically an elementary block system.

SECONDARY LINES.—The form of cross-section of the track should be such that there is always a space of .65 ft. between the ballast and the inside of the rail, and the top of the ballast between the rails must not be more than .26 ft. above the level of the top of the rail (fig. 9). The distance

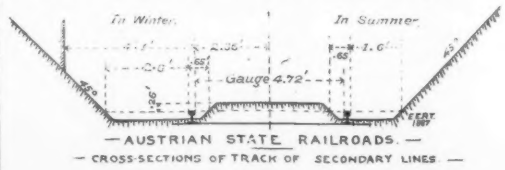


Fig. 9.

between the outside of the rail and the slope of a cut must not be less than 2.6 ft. in winter, to allow of the passage of the snow plow; but in summer this may be reduced to 1.6 ft. The angle of the side slopes is never to exceed 45°. Signals are not obligatory. As mixed trains are not frequent, light trains consisting of a few cars are run on many of the lines to increase the facilities for travel at low cost. These are worked on the secondary lines and on sections of main lines, alternating with the through trains, and especially in the suburbs of large towns.

LOCOMOTIVES.—The external appearance of the locomotives is heavy and awkward; they have, as a rule, deep plate frames, in some cases outside the wheels, and outside cylinders. Outline diagrams are given of ten types, and following are the leading dimensions, etc.

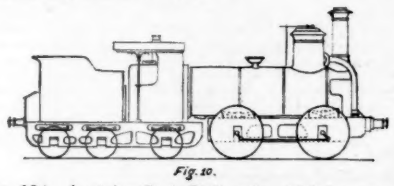


Fig. 10.

(Fig. 10.) Austrian State Railroads. This is an engine on the Engerth system, the front being carried on four coupled wheels on one frame, and the rear end and tank on six wheels on another frame. The cylinders are inside, $16\frac{3}{16}$ in. by $22\frac{13}{16}$ in.; the coupled wheels are 5 ft. 2 in. dia., with a wheel base of 8 ft. 7¾ in., and the other wheels are 3 ft. 1¼ in. dia., with a wheel base of 11 ft. 4⅛ in.; the total wheel base is 27 ft. 3½ in. Total length, 38 ft. 5 in.; maximum width, 9 ft. 7½ in.; height, 15 ft. 2½ in. The weight in working order is 50.6 tons, distributed as follows, commencing at the leaders, 10.9, 13.15, 9.0, 8.8, 8.75 tons.

(Fig. 11.) Austrian State Railroads. An eight-coupled engine, outside cylinders, 18½ by 24⅞ in.; wheels, 3 ft. $10\frac{11}{16}$ in. dia.; wheel base, 12 ft. 5⅜ in., but as the trailing axle

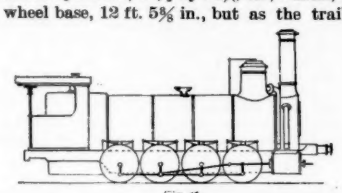


Fig. 11.

has lateral play the rigid wheel base is 9 ft. 2 in. The weight empty is 39 tons, in working order 44.35 tons, distributed as follows: 11.3, 10.8, 11.15, 11.1 tons.

(Fig. 12.) Austrian State Railroads. A six-coupled freight engine; outside cylinders, $15\frac{9}{16}$ by 24⅞ in.; wheels, 3 ft. 6⅝

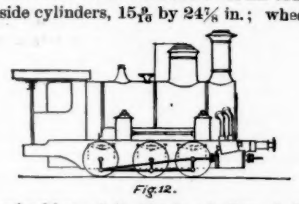


Fig. 12.

in. in dia.; wheel base, 9 ft. 4⅛ in.; boiler, 4 ft. 5 in. dia. The weight empty is 28.5 tons; in working order, 32.2 tons, as follows: 10 3, 10.25, 11.65 tons.

(Fig. 13.) Carl Ludwig Railroad (Austria). A four-coupled passenger engine with single pair of trailers; outside cylinders, 15⅝ by 24⅛ in.; coupled wheels 6 ft. 3 in. dia., trailers 3 ft. 3½ in.; wheel base, 13 ft. 5⅞ in.; diameter of boiler, 48⅝ in.; 155 tubes, $2\frac{3}{32}$ in. outside diameter, 12 ft. 10¾ in.

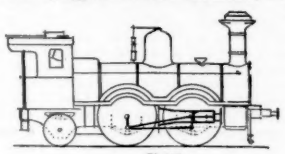


Fig. 13.

between tube plates; heating surface, 1,178.5 sq. ft. (fire-box 85.2, tubes 1,093.3), grate area 16 sq. ft.; weight in working order, 32 tons, as follows: 12, 12.5, 7.5 tons. The tender is on six wheels and carries 5¼ tons of fuel and 1,980 gallons of water.

(Fig. 14.) Kaiserin Elizabeth Railroad (Austria). An eight coupled freight engine; outside cylinders, 17⅝ by 22⅛ in.;

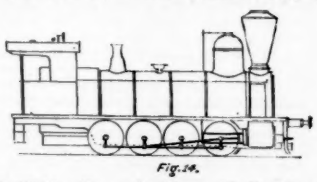


Fig. 14.

wheels, 3 ft. 7⅛ in. dia.; wheel base, 11 ft. 9 in.; weight in working order, 42.35 tons, as follows: 10.6, 10.6, 10.5, 10.65 tons.

(Fig. 15.) Northwestern Railroad (Austria). A four-coupled

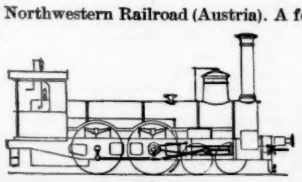


Fig. 15.

passenger engine with four-wheeled leading truck; outside cylinders, 16⅛ by 24⅞ in.; outside frames and valve gear; coupled wheels, 5 ft. 2¼ in. dia.; wheel base, 5 ft. 5⅝ in.; truck wheels, 3 ft. 1⅝ in. dia.; wheel base, 3 ft. 4½ in.; total wheel base, 13 ft. 8⅝ in.; length over frames, 25 ft. 8½ in.; weight in working order, 32 tons—12.25 on truck, 12 on drivers, 11.75 on trailers. Tender carried on six wheels, 3 ft. 2⅞ in. dia.; length, 18 ft. 4½ in.

(Fig. 16.) Southern Railroad (Austria). A four-coupled express engine with four-wheeled leading truck; outside cylinders, 16½ by 24⅞ in.; outside frames and valve gear;

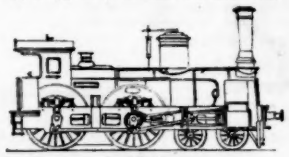


Fig. 16.

coupled wheels, 6 ft. 2⅞ in. dia.; truck wheels, 36.1 in. dia.; wheel base, 17 ft. 7 in.; height of smoke stack from rails, 14 ft. 4 in.; weight in working order, 37.5 tons—14.5 on truck, 12 on drivers, 11 on trailers.

(Fig. 17.) Southern Railroad (Austria). An eight-coupled freight engine for the Semmering incline; outside cylinders,

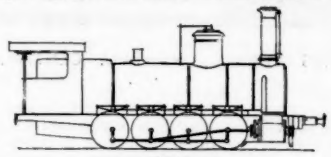


Fig. 17.

$19\frac{11}{16}$ by 24 in.; wheels, 3 ft. 7½ in. dia.; wheel base, 11 ft. 8½ in.; diameter of boiler, 4 ft. 11 in.; weight in working order, 51 tons, as follows: 12.5, 12.5, 13, 13 tons.

(Fig. 18.) Hungarian State Railroads. An eight-coupled freight engine for mountain service; outside cylinders, 20½ by 24 in.; outside frames, inside valve gear; wheels, 3 ft. 6⅛ in. dia.; wheel base, 11 ft. 9¾ in.; the trailing axle has lateral play; height to top of smoke stack, 14 ft. 6 in.; weight, empty, 41 tons; in working order, 46 tons—10¾, 11¾, 11¾, 11¾ tons.

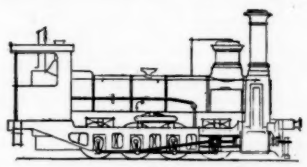


Fig. 18.

(Fig. 19.) Upper Silesian Railroad. A six-coupled tank engine; outside cylinders, 17½ by $24\frac{11}{16}$ in.; wheels, 4 ft. 7½ in. dia.; wheel base, 12 ft. 4¼ in.; height from rails, 14 ft. 1¼ in.; working pressure, 124 lbs.; weight in working

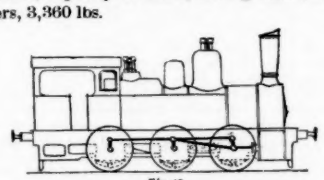


Fig. 19.

order, 40 tons; capacity of tanks, 880 gallons; capacity of fuel bunkers, 3,360 lbs.

ROLLING STOCK.—The interior arrangements of the cars are somewhat peculiar. On the secondary lines they have a central passage, with side doors and steps at each corner. On the cars fitted with compartments for baggage the corners are cut off and the doors placed on the angle. The leading dimensions are: Length over buffers, 32.8 ft.; width, 5.7 ft.; wheel base, 16 ft. The first-class cars have transverse compartments, with an interior gangway along one side and at the ends of the cars. Some have corner doors and others side doors at each end. The cars are carried on two rigidly fixed axles. The sleeping cars have three axles, are divided into four compartments, and have only a lower tier of berths. They have end platforms.

With regard to the passage of freight cars by the custom houses at the frontier, the cars were originally inspected by Government officials with a view to ascertaining if any secret compartments existed, and upon a satisfactory inspection an imperial eagle was stamped on the car, and this inspection and mark had to be renewed whenever the car underwent repairs of any importance. This regulation, however, gradually fell into desuetude, and in 1880 and 1882 trouble was caused by the custom officials at Eger not allowing certain cars to pass out of the country, and holding them with a fine imposed on the owning company, which fines were remitted by the Minister of Commerce. In 1882 a commission appointed to consider the matter recommended that the official mark be abolished and some form of sealing adopted, and the following rules were adopted July, 1883:

The sides, floor and roof must be in good condition, but ordinary damage to the sides will not be considered as a reason for holding back the car unless the cracks are large enough to permit unlawful access to the interior. The space between the closed doors and the door-posts of box cars must not exceed half an inch. Each rolling door must be fitted with a fastening hook, the hook being attached by a bolt, whose nut is placed inside the car. The sealing is effected by means of a hook; the door being closed the hook cannot then be raised without breaking the seal (fig. 20). The screw-ring which receives the hook is to be riveted to the door-post or to the iron against which the door butts when closed, or else must be attached by bolts having their nuts on the inside of the car. The rolling, swing and front doors must be provided with rings or other fastenings permitting the introduction of

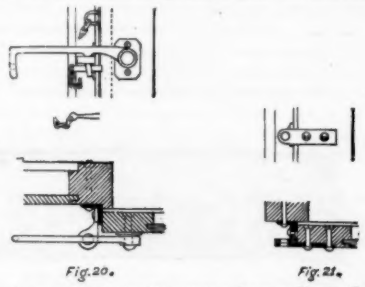


Fig. 20. Fig. 21.

lead seals or padlocks by the custom house officers (fig. 21), so that it may be impossible to open the doors without breaking them open or fracturing the official seal. These rings are to be fastened with bolts having the heads on the inside of the car. The iron strap at the opposite side of the door, to which are affixed the fastenings, should be secured in such a way as to prevent the rolling door from being lifted from the sliding rail. This may be done by means of a bolt which, on the closing of the door, engages in a socket riveted to the sliding rail (fig. 22), or by prolonging the strap downward as far as

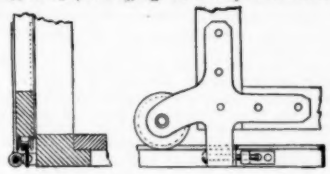


Fig. 22.

the under side of the head of the sliding rail, or, better still, by riveting a bracket or flange to this rail. The supports of the rollers should be so fastened as to prevent their being lifted without being broken. The guide rails of rolling doors must be riveted to at least two of the supports to prevent the possibility of raising them; these supports, or brackets, are to be so attached to the frame that when the door is closed they can only be raised by being broken open, leaving visible marks of the injury. The upper guide rails are to be secured by

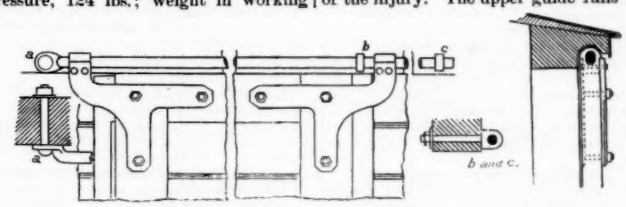


Fig. 23.

rods or grooved rails conveniently placed (fig. 23). With box cars having swing doors and a front door, these doors must be provided with screw rings for official seals in addition to the fastenings and interior bars. The windows, traps and shutters in the sides of the car to be fastened on the inside by bolts, hooks, etc., so that they cannot be opened from the outside, and the grating, or grated sash, if there be one, must be fastened with bolts having the nuts inside the car. The roof lamps must be closed by inside shutters or by a cover to prevent access to the bolts. Wagons with open sides, such as cattle or coke cars, if they fulfill the above requirements must only be used for such freight as cannot be removed through the openings. Open cars can only be used when provided with firmly attached screw rings for the attachment of the tilt by sealed strings, or when the tilt can be fastened to brackets, etc.

E. E. RUSSELL TRATMAN, C. E.

The Wickes Tunnel, Montana Central Railway.*

The route of the Montana Central Railway, between Helena and Butte, crosses the divide between the valleys of the Prickly Pear and the Boulder, at an altitude of about 5,450 ft., the surface being about 6,200 ft. above the sea. This will require a tunnel about 6,170 ft. in length. As in all such cases, it is of great importance to build it in the shortest possible time.

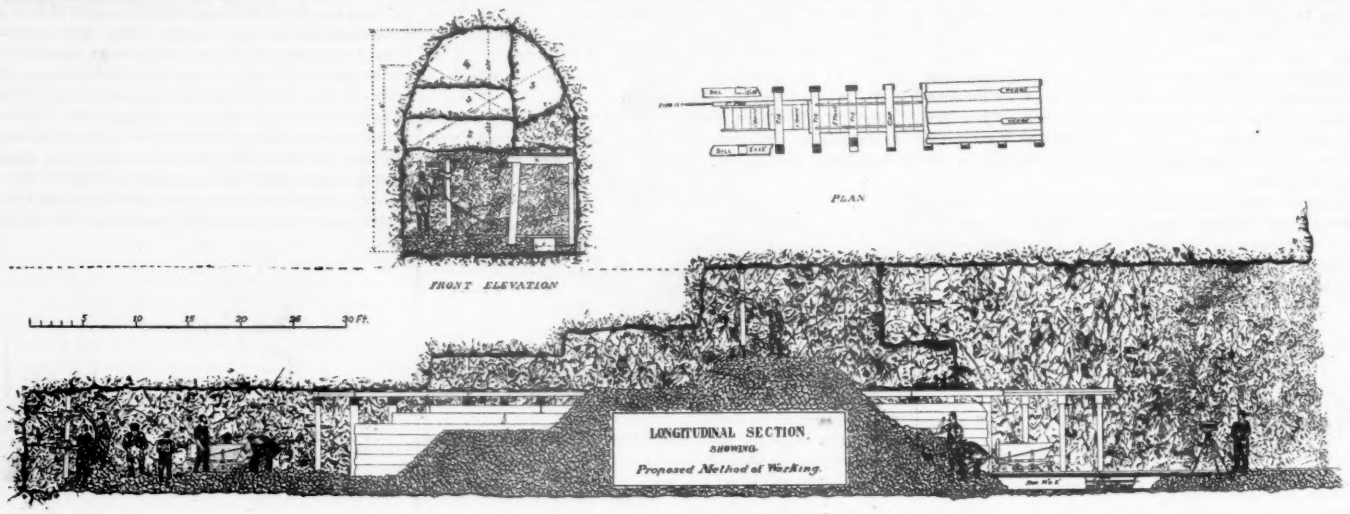
The outcroppings of rock in the immediate vicinity of the south portal are granite, and the numerous excavations made near by indicate that at a depth of 25 ft. to 40 ft. the rock will be self-supporting. The mountain is entirely covered with grass, and devoid of timber. The surface is smoothly rounded and shows some small outcroppings of trap rock on the slightly elevated peaks. Some veins of low-grade lead and silver ore have been found near by and appear to cross the railroad line nearly at right angles.

There can be little doubt but that the material for the whole length of the tunnel will be rock; but a portion, say from 10 to 40 per cent., may possibly require lining.

Two small valleys meet about 500 ft. from the south portal and about 125 ft. above grade; down one of which flows a stream, which may, perhaps, supply five or six cubic feet of water per minute. The grades are arranged, however, to make the tunnel self draining, and hence no serious trouble is apprehended from that source.

The problem now is, how is this tunnel to be built to insure its completion in fourteen months.

* By J. T. Dodge, Chief Engineer. From the *Journal of the Association of Engineering Societies*, August, 1887.



THE WICKES TUNNEL, MONTANA CENTRAL RAILWAY.

In case much longer time is required, it will be necessary to construct an overhead line with a four per cent. grade, at a cost of $40,000 to $50,000. Experience in the Mullan and Bozeman tunnels in this vicinity, shows that it is very difficult to drive a full-size, single-track tunnel, with ample machinery and high explosives in good ground, more than 7 ft. per day for a series of months. To drive a tunnel at that speed requires about 75 yards of rock to be broken and shoveled per day. Nearly that amount was handled at the Bozeman tunnel for three consecutive months. By recent reports of the Croton Aqueduct it would seem that about 80 cubic yards of rock have been broken and shoveled there per day under the stimulus of a prize. Experience at the Arlberg tunnel shows that a heading, 8 ft. high by 9 ft. wide, can be driven, in good ground, an average of over 17 ft. per day for a year together, and that in ground where almost constant timbering was required, the worst progress made, for a year together, was 3,466 ft., or 9.5 ft. per day. The highest day's progress on record there was 26 ft., which would require about 75 cubic yards of rock to be broken and shoveled, in a space 9 ft. wide, while a progress of 17 ft. would require about 50 cubic yards. Now, if 75 cubic yards of rock have been broken and shoveled at a face 9 ft. wide, it would seem quite practicable to break and shovel a like amount at a face 16 ft. wide.

When Mullan tunnel, which was entirely in granite, of which 60 per cent. was so hard as to be self-supporting, was driven at the rate of 4¼ ft. per day, exact observations made for seven days showed that three Eclipse drills, 3½-in. cylinders, did not run over one-third the time. When the same tunnel was driven 7 ft. per day the same drills were amply sufficient for the work, and though no exact records were kept in the latter case, it is highly improbable that they ran much more than half the time, and there is little doubt that they would have been sufficient to break 75 yards in a heading 8 ft. by 16 ft., which would give an advance of over 14 ft. per day. If now it is conceded that a heading can be driven 14 ft. per day, the next question is, can the enlargement be made to keep pace with it? Experience at the Arlberg answers this question in the affirmative, not only in good ground but in bad. The same methods ought to give a like result. The question, however, is raised whether, in good ground, a simple method may not be more economical and equally efficient.

The accompanying diagram shows an arrangement for driving a heading of the full width of the tunnel and of a convenient height, say 8 ft., laying the track close to one side, with a ventilating duct, a compressed air pipe and a water pipe, directly below the track and all protected by a substantial timbering and lagging, sufficiently strong to withstand the pressure of the rock to be stoped down from above.

The number of working points for enlargement can be increased at pleasure. The only waste of labor or material required is in keeping up the timber protection of the main track, but that timber can be used over and over. Faith in a bottom heading was the foundation of the triumphant success achieved at the Arlberg, and the query is respectfully propounded to this society, whether there is not good grounds for hoping that in these United States we may yet approximate, more nearly than has yet been done, to the achievements in tunneling of our brethren across the Atlantic. From recent orders received by the Ingersoll Drill Company, it is conjectured the plan of a bottom heading is abandoned.

Increase of Adhesion by the Electric Current*

The object of this paper is to lay before you the results of some recent experiments in a comparatively new field of operation, but one that, judging from the results already attained, is destined to become of great importance and value in its practical application to various branches of industry. The subject is the use of the electric current as a means of increasing and varying the frictional adhesion of rolling contacts and other rubbing surfaces.

It has been discovered more recently that in the operation of electric railroads in which the track rails form part of the circuit, a considerable increase in the tractive adhesion of the driving wheels is manifested, due to the passage of the return current from the wheels into the track. In the Baltimore and Hampden electric railroad, using the Daft "third rail" system, this increased tractive adhesion enables the motors to ascend without slipping a long grade of 350 ft. to the mile, drawing two heavily loaded cars, which result, it is claimed, is not obtainable by steam or other self-propelling motors of similar weight.

In order to ascertain the practical value of the electric current as a means of increasing mechanical friction, and if possible render it commercially and practically useful wherever such additional friction might be desirable, as for example in the transmission of power, etc., a series of experiments was entered into by the author, which, though not yet fully completed, are sufficiently advanced to show that an electric current, when properly applied, is capable of very materially increasing the mechanical friction of rotating bodies, in some cases as much as from 50 to 100 per cent., with a very economical expenditure of current, this increase depending upon the nature of the substances in contact, and being capable of being raised by an increased flow of current.

* Extracts from a paper read before The American Association for the Advancement of Science, New York meeting, 1887, by Elihu E. Ries.

Before entering into a description of the means by which this result is produced, and how it is proposed to apply this method practically to railroad and other purposes, it may be well to give a general outline of what has so far been determined. These experiments have shown that the coefficient of friction between two conducting surfaces is very much increased by the passage therethrough of an electric current of *low electromotive force and large volume*, and this is especially noticeable between two rolling surfaces in peripheral contact with each other, or between a rolling and a stationary surface, as in the case of a driving wheel running upon a rail. This effect increases with the number of ampères of current flowing through the circuit, of which the two surfaces form part, and is not materially affected by the electromotive force, so long as the latter is sufficient to overcome the electrical resistance of the circuit. This increase in frictional adhesion is principally noticeable in iron, steel and other metallic bodies, and is due to a molecular change in the conducting substances at their point of contact (which is also the point of greatest resistance in the circuit), caused by the heat developed at that point. This heat is ordinarily imperceptible, and becomes apparent only when the current strength is largely augmented. It is therefore probable that a portion of this increased tractive adhesion is due directly to the current itself, aside from its heating effect, although I have not as yet been able to ascertain this definitely. The most economical and efficient results have been obtained by the employment of a transformed current of extremely low electromotive force (between ½ and 1 volt), but of very large volume or quantity, this latter being variable at will, so as to obtain different degrees of frictional resistance in the substances under observation.

These experiments were originally directed mainly toward an endeavor to increase the tractive adhesion of the driving wheels of locomotives and other vehicles, and to utilize the electric current for this purpose in such a manner as to render it entirely safe, practical and economical. It will be apparent at once that a method of increasing the tractive power of the present steam locomotives by more than 50 per cent., without adding to their weight and without injury to the roadbed and wheel tires such as caused by the sand now commonly used, would prove of considerable value, and the same holds true with respect to electrically-propelled street cars.

The current in the present instance [model shown] is one of alternating polarity, which is converted by the transformer into one having the required volume. The electromotive force of this secondary current is somewhat higher than that necessary. In practice it would be about half a volt. You will notice, upon a closer inspection, that one of the forward driving wheels is insulated from its axle, and the transformed current, after passing to a regulating switch under the control of the engineer or driver, goes to this insulated wheel, from which it enters the track rail, then through the rear pair of driving wheels and axle to the opposite rail, and then flows up through the forward uninsulated wheel, from the axle of which it returns by way of a contact brush to the opposite terminal of the secondary coil of the transformer. Thus the current is made to flow *seriatim* through all four of the driving wheels, completing its circuit through that portion of the rails lying between the two axles, and generating a sufficient amount of heat at each point of contact to produce the molecular change before referred to. By means of the regulating switch the engineer can control the amount of current flowing at any time, and can even increase its strength to such an extent, in wet or slippery weather, as to evaporate any moisture that may adhere to the surface of the rails at the point of contact with the wheels while the locomotive or motor-car is under full speed.

It will be apparent that inasmuch as the "traction circuit" moves along with the locomotive and is complete through its driving-wheel base, the track rails in front and rear of the same are at all times entirely free from current, and no danger whatever can occur by coming in contact with the rails between successive motors. Moreover, the potential used in the present arrangement, while sufficient to overcome the extremely low resistance of the moving circuit, is too small to cause an appreciable loss of current from that portion of the rails in circuit even under the most unfavorable conditions of the weather. In practice the primary current necessary is perfectly generated by a small-high speed alternating dynamo on the locomotive, the current being converted by means of an inductional transformer similar in construction to the one here shown. To avoid the necessity for electrically bridging the rail joints, a modified arrangement may be employed, in which the electrical connection is made directly with a fixed collar on the forward and rear driving axles, the current dividing itself in parallel between the two rails in such a manner that if a defective joint exists in the rail at one side the circuit is still complete through the rail on the other, and as the rails usually break joints on opposite sides this arrangement is found very effective. The insulation of the driving wheels is very easily effected in either case.

As the amount of additional tractive adhesion produced depends upon the quantity of current flowing rather than upon its pressure, the reason for transforming the current as described will be apparent, and its advantages over a direct current of higher tension and less quantity, both from an economical and practical standpoint, will for this reason be clear. The amount of heat produced at the point of contact between the wheels and rails is never large enough to injure or otherwise affect them, although it may be quite possible to increase the current sufficiently to produce a very considerable heating effect. The amount of current sent through the traction circuit will, of course, vary with the requirements, and as the extent to which the resistance to slipping may be increased is very great, this method is likely to prove of considerable value. While in some cases the use of such a method of increasing the tractive power of locomotives would be confined to ascending gradients and the movement of exceptionally heavy loads, in others it would prove useful as a constant factor in the work of transportation. In cases like that of the New York elevated system, where the traffic during certain hours is much beyond the capacity of the trains, and the structure unable to support the weight of heavier engines, a system like that just described would prove of very great benefit, as it would easily enable the present engines to draw two or three additional cars with far less slipping and lost motion than is the case when mechanical friction alone is relied upon, at a cost for tractive current that is insignificant compared to the advantages gained.

The Sellers System of Screw Threads.

Last October the Franklin Institute received from the Society of German Engineers, of Berlin, a communication asking if any standard screw thread had been adopted in the United States, saying that in *Engineering* of Sept. 10, 1886, there appeared an article in which the assertion was made that the system of threads proposed by Sellers had not been found to fully meet the requirements and had been abandoned. Some facts bearing on this assertion appeared in the *Railroad Gazette* of Sept. 24, 1886. Amongst other things the Pratt & Whitney Co. said at that time, "as to the Seller thread being a failure, we will only refer to the fact that in our large and increasing productions of taps and dies for this country, ninety per cent. are United States standard, while many not strictly United States standard in number of threads per inch are so in form of thread."

Dr. Wahl, the Secretary of the Franklin Institute, addressed, in December, a letter to the superintendents of various railroad companies, noting the inquiry of the German Society and added

"As some contribution to this inquiry, it would be of interest to know whether the standard thread has been adopted upon your road, and whether you have experienced any difficulty in practically maintaining the form of the thread, or at least sufficiently so as to make the nuts interchangeable. If you find that the straight surfaces are more difficult to maintain than the curved ones of the Whitworth thread, would this be counterbalanced by the greater facility for making the straight thread with a single tool over that of the curved thread which requires two tools, and which form of thread can most easily be constructed and tested, for accurate conformity, with a standard of its form?"

In response to this letter he received replies from railroad companies operating and controlling 25,000 miles of road.

He had also a reply from one of our largest manufacturers of bolts and nuts, and one from our most important manufacturers of taps and dies.

Extracts from some of the letters received in response to the secretary's inquiry follow:

From the Louisville & Nashville Railroad Company:

We adopted the United States Standard thread, sometimes called the Franklin Institute thread, about five years ago, in all the shops of our lines, and have used it ever since. We have found no difficulty whatever from the wearing of the taps and dies as long as they are not used beyond a proper length of time. Of course, as taps and dies wear away, it will make a slight difference in the form of the thread; but I do not believe that that change is any greater or can give any more trouble than in the case of the Whitworth thread referred to. We have experienced no difficulty in the interchange of nuts and bolts on account of the slight change that occurs in the form of the thread in the wearing of the taps and dies. Of course, any form of thread will change slightly from the wearing of the taps and dies, and it is impossible to avoid that by any form of thread used. A straight side to a thread is easier to make than a rounding side, and therefore more likely to be perfect. A straight side to a thread, it seems to me, will change as little, perhaps less, than a rounding side. The proper way to keep threads as near the original as possible is to throw away the taps and dies before they are worn to such an extent as will make any practical difference in the shape of the thread. This is a matter that is sometimes overlooked. The expense of taps and dies is not great, and only perfect taps and dies should be used; and as soon as the wear amounts to enough to make an appreciable difference in the form of the thread, they should be thrown away and renewed. We have made it a rule to purchase from reliable manufacturers nearly all of our taps and bobs for cutting dies, and we have been particular to throw away taps as soon as they are worn to any considerable extent, and use new ones. The same in regard to dies; as soon as the wear amounts to

anything, we recut them, dress them up, and then they are as good as new. It seems to me a flat-top form of thread will change as little as a thread that runs to a point. It will change less in diameter from out to out of the thread. With a sharp-top thread, when the sides wear away slightly, it reduces the height of the thread. With a flat-top thread the wear of the sides will not reduce the diameter from out to out of the thread, but will simply make the thread a little thinner at the point, etc.

R. WELLS, Superintendent Machinery.

From the Delaware, Lackawanna & Western Railroad:

The United States Standard has been adopted on this road and gives entire satisfaction. It is much easier to make, and the tools to make it less expensive to keep up.

CHAS. GRAHAM, Master Mechanic.

From the Chicago, Milwaukee & St. Paul Railway:

In 1871, the locomotive department of this company adopted what is known as the United States, or Franklin Institute, Standard, for diameters and threads, and have continued to use it up to the present time. We have experienced no particular difficulty in the interchanging of nuts. Should there be any difficulty in maintaining the straight surfaces of the threads more than those of the Whitworth type, it would in our opinion be more than counterbalanced in costing less to maintain the straight surfaces than the curved. We are of opinion, however, that the Whitworth thread is the strongest, *i. e.*, less liable to fracture the bolt.

I. M. LOWRY,
General Master Mechanic.

From the Chicago, Rock Island & Pacific Railroad:

About three years ago we adopted the United States Standard thread for bolts and nuts, and have so far experienced no difficulty whatever in practically maintaining the form of the thread. I have not yet seen a case where a bolt had worn so that nuts were not interchangeable.

I have had very little experience with the Whitworth thread, but feel certain that any slight advantage in durability or strength which it may have over the United States Standard is far outweighed by the inconvenience in its construction.

THOS. B. TWOMBLY,
General Master Mechanic.

From the Chicago, Burlington & Quincy:

The United States Standard or Franklin Institute thread was adopted in the car department of the Chicago, Burlington & Quincy in 1883, and since then has been gradually introduced into the locomotive and track departments. For two years past we have used this thread for all purposes. We have had no difficulty whatever in maintaining the form of the thread, that is to say, we can forward to any point on our line new nuts, which can be used satisfactorily on old bolts. Our foremen all speak highly of the United States Standard, owing to the facility of maintaining a uniform shape. One of our foremen at Burlington, Mr. Scholey, who has used the Whitworth thread in the old country, and the United States Standard in this country, says the latter is much more easily maintained. We inclose you some correspondence from our master mechanics on this matter.

G. W. RHODES, Supt. M. P.

We have experienced no difficulty whatever in practically maintaining the form of the thread; that is to say, that we can forward to any point a supply of new nuts, which can be used on bolts that have been in service since that time. Foremen of other shops substantiate Mr. Geyer's statement, that it is much more difficult to maintain the curved surface of the Whitworth thread than the straight or United States Standard. We have no absolute data on this subject, other than practical experience for the past three years. We are gradually changing the thread of bolts in all departments to the straight, or United States Standard. In doing this, we experience no difficulty or annoyance, as the men in each department keep a small quantity of old nuts with the old thread, so as to avoid throwing away bolts. We undoubtedly shall eventually have nothing but the United States Standard thread in use in all departments. L. E. JOHNSON.

It is my opinion that the Whitworth Standard tap is very impracticable, as it is a hard matter to make them twice alike, therefore, much more expensive. It is true, if a nut and bolt is in constant use, it will wear about the shape of the Whitworth Standard, and it may be more durable. We have never, as yet, experienced any trouble with the United States Standard thread. A new nut can always be substituted where an old one of the same size is taken off. It will cost at least double to maintain the tools of the round or Whitworth thread, and, it is my opinion, it is not any better or stronger than the straight or United States Standard thread. C. F. GEYER.

From the Pennsylvania Railroad Company:

In our experience we have had no trouble at all in maintaining the form of thread of the United States Standard, and the nuts we tap are perfectly interchangeable. We think the straight surfaces are much more easily maintained than the curved ones of the Whitworth thread would be, for the reason that it is easier to discover irregularities in straight than in curved lines, and it is quite easy to grind a thread cutting tool to the straight lines of the standard thread.

THEO. N. ELY,
General Superintendent Motive Power.

From the New York Central & Hudson River Railroad Company:

We adopted the United States Standard form of thread three years ago, and have never experienced any difficulty in maintaining the form of threads, or in making nuts interchangeable. For durability, think the Whitworth thread is the best; but for ordinary work, think this feature is offset by the difficulty in reproducing it. The facility with which the straight threads can be produced by an ordinary workman with tools that can be readily made and maintained, so as to conform to the standard gauges, is a recommendation sufficient in itself. WM. BUCHANAN.

From the New York, Lake Erie & Western Railroad Company:

We have made careful inquiry in regard to this matter from all our master mechanics and foremen of car repair, and the general opinion is about as follows: There is little question about the practical superiority of the Sellers or United States Standard thread. The principal differences between the two are in the angle of the thread and the form at top and root of thread. The angle of the Sellers thread is more easily maintained than the other, because a templet can be accurately made without the use of special tools, as it is easy to construct the angle geometrically. It is also simpler and cheaper to cut the Sellers thread in a lathe. It is a difficult matter to make the nut fit closely on the curved portion of the Whitworth thread, and practically the bearing surface will probably be limited to the straight parts, making it considerably less than in the Sellers system, consequently more liable to be distorted as far as this element goes. We have no trouble arising from the wear of the United States Standard tap sufficient to prevent the nuts from being interchangeable.

RICHARD H. SOULE,
Superintendent Motive Power.

From the Pratt & Whitney Company:

Regarding our experience as manufacturers of taps and dies, especially those covering the application of the Sellers system of screw-threads, now known as the Franklin Institute or United States Standard, we can say, as stated in our letter to the *Railroad Gazette*, and published in their issue of Sept. 24, 1886, included in article on "Screw-Threads," that the orders we receive for taps and dies fromrailroad companies, bolt manufacturers, bridge builders and manufacturers generally, in the United States, are largely for the United States Standard thread. Fully ninety per cent. are strictly so, and many of the others not United States Standard both in form of thread and pitch, are so in shape of the thread, *i. e.*, flat at top and bottom, one-eighth of the pitch, and having a greater number of threads per inch. This is necessary for special cases, such as tool work and small diameter taps and boits. The form of the Sellers, Franklin Institute or United States Standard thread, is such asto make it the most practicable for duplication to gauge, and by making the outside diameter slightly larger (not, however, larger in the angle of the thread), the life of the tap, or before it wears below gauge size, is greatly lengthened. The claim that the form of the Sellers thread cannot be maintained in use, seems, in our experience, inadmissible, for although the corners may wear slightly, this wear is unimportant if the taps are properly used, and especially so, if made as recommended—slightly larger in the outside diameter.

THE PRATT & WHITNEY COMPANY,
GEO. M. BOND, Manager Gauge Department.

Dr. Wahl forwarded the documents to the German Society and received the following reply:

BERLIN, W., Feb. 19, 1887.
Wichmann Street, 14.

WM. H. WAHL, Secretary Franklin Institute, Philadelphia:

DEAR SIR: We owe you many thanks for the painstaking manner in which you have attended to our request of Oct. 22, 1886, and for your valued sending of thirty-first of January, 1887, which also answers ours of the fourteenth of February, 1887.

With the facts now in our possession we are enabled to support our efforts for the introduction of a standard thread, having the Sellers form of cross-section, upon the precedents established in your country, and to reply to the false representations of the English journals, which incline rather to the gratification of the national vanity than to what is right and proper in the premises. We gladly place ourselves at your disposal for a return of favors, and remain, with high esteem,

THE SOCIETY OF GERMAN ENGINEERS,
TH. PETERS.

The Strike on the Midland of England.

The last *Railway News* has a very clear account of the causes of the late strike on this road. According to this paper the official version is that the passenger and goods drivers had for full pay 7s. 6d. or $1.80 per day and the firemen 48 and 60 cents per day, the working day for trainmen being 10 hours and for shunters 12 hours, the latter being allowed 1½ hours out of this for meals, and receiving pay for any part of the hour and a half they worked. Time worked beyond the 10 and 12 hours respectively, and Sunday time being rated at 8 hours per day. "The company guaranteed each man a full week's work, and if it became impossible to provide it they have paid the men for the time not worked. That is to say, they have paid a full week's wages whether the time was made up or not. In this respect it is understood the Midland Company have stood almost alone, the men on few, if any other, roads in the kingdom being allowed such advantageous terms." As according to the secretary, "The system of payment for six days per week when men are not called on duty has been shown by experience to work badly, as it sometimes tends to give enginemen and firemen an interest in shirking work," a circular was issued on July 15, amending the regulation so that the men would not be entitled to a full week's pay unless it was actually earned. This new regulation gave the enginemen $10.80 per week, if they got a full week's work without over or Sunday time, but it required them to work for four years for sums increasing from $1.20 to $1.68 per day before getting the full pay and to hold themselves in readiness for work.

After a long discussion between the chairman and deputy-chairman on one side and the representatives of the men on the other, an official circular was issued which stated that the alteration in the system of payments was not a financial question, but one in which experience had shown the change to be necessary for the discipline and efficiency of the service; after which the men had a meeting and issued a circular stating "that unless some concession is made by Thursday night (Aug. 4), a crisis will inevitably ensue;" and telegraphed to each director asking a suspension of the new rule till Aug. 11.

No answer was returned to the telegrams and the company made preparations for a strike, which occurred on the night of the 4th. Freight trains were left under the protection of danger signals with the fires raked out, but passengers, mails and perishable freights were carried through.

The Amalgamated Society of Railway Servants appealed to men serving on other roads not to accept service on the Midland during the continuance of the strike, promising "the fullest protection to any man who may be intimidated in declining to act as a blackleg;" but as the pay on the Midland is better than on most other roads, the places were soon filled and the strike was virtually a failure by 2 p. m. on Friday.

Foreign Technical Notes.

It seems that the Northern Railroad of France is using tentatively, some movable seats for its engine drivers and firemen, so that they can sit down during the long stops sometimes made by freight and switching engines. It seems expected that the men will only occupy these when their machines are standing, but as the seats are arranged so that the occupants command a full view of the track and accessibility to the apparatus for handling the engine, it will not be surprising if they are occasionally occupied at other times. It is not creditable to the humanity of European railroad officials that such seats have not been universally introduced already.

We extract the following interesting particulars about the great Bessemer Steel Works erected in 1886 at Terni, near Rome, from the Swiss *Bauzeitung*.

These works were erected to supply the demand for armor plates, rails, and wheel tires, which has been hitherto almost entirely filled from abroad. The great hammer weighs 100 tons, and its foundation, which was cast in one piece at the Terni works, weighs 1,000 tons. The fall of the hammer is 16 ft. 5 in.; the cylinder diameter, 6 ft. 3½ in.; the piston rod, 1 ft. 1½ in. in diameter; the whole height of the hammer 62 ft., and that of the iron roof which covers it and its two cranes of 100 and 150 tons capacity respectively, is 141 ft. The hammer and the cranes are run by compressed air of 75 lbs. pressure.

This air pressure is maintained by four coupled Dubois-Francois air compressors worked by water column machines of a collective power of 1,120 H. P.

The works of the rolling mill, embracing 6 roll trains and the necessary shears, cranes, pumps, etc., employ 3,030 H. P., which is afforded by 11 turbines, all of the Girard high pressure type, working under a head of 590 feet, and making from 180 to 850 revolutions per minute. These turbines are all vertical, with horizontal axis, and range in diameter from 26 inches to 8⅛ ft.

These colossal works are supplied with water from the river Velino by an aqueduct over four miles long, with a siphon of 394 ft. depression, across the river Nera, and a tunnel 1⅜ miles long. At the end of the tunnel the water is stored in a reservoir, from which it is delivered to the various turbines by two lines of 27½ in. pipe. The most powerful turbine can furnish 1,000 H. P., and is run at two speeds, 180 and 240 revolutions per minute, giving at the latter speed the circumferential velocity of 114 ft. per second; but the velocity is liable to run up to 197 ft. per second when the rolls are empty.

The security against rupture of these wheels by this tremendous velocity is calculated to be five fold, secured, first, by a very high quality of cast iron in the wheel, and reinforced by two welded steel rings around the circumference of the wheel. It would seem, however, as if this method of strengthening by the combined action of steel and cast iron must require the most delicate adjustment to develop anything like the full strength of both The velocity of the big turbines is regulated under the varying conditions of the work by a throttle valve close to the turbine. This valve is operated by a man, whose sole duty it is; and to avoid any risk of bursting the pipes by too rapid a closing under the great pressure used, a by-pass is arranged around the main valve and turbine, which is operated by the same movement which closes the main valve. The turbines for the works were all furnished by the firm of J. J. Rieter & Co., Winterthur, Switzerland.

A new danger for railroad men is brought to light now that color blindness has fallen somewhat into the background, by the results of an investigation of the hearing capacity of the Wurtemberg railroad servants. The results are given in the following table in percentages of the total number examined. Some of the classes seem to partially include others from the fact that the percentages of the various classes amount to more than 100 when added up.

	Engine-men.	Fire-men	Brake-men.	Conductors.
Normal hearing	8	45	80.0	81.0
Fair "	27	23	15.5	11.5
Bad "	67	30	....	7.5
Incapable of satisfactory service	35	8		

It may be queried by the patriotic American, whether the trouble in engine-drivers and firemen is not due to the very high pitched whistles used in Europe and to their use instead of bells for all sorts of engine signaling.

The Russian Government, as we learn from the German railroad *Organ*, opened last year the first of what is intended to be a large number of retreats for old or incapitated railroad employés.

According to the collective capacity of these retreats, each railroad will have the right, in proportion to its length (which seems, by the way, an unsatisfactory basis. The number of its employés would seem a better one), to a certain number of places for retired servants, who must, of course, be provided with proper medical certificates and other documents showing their incapacity for service and their general merit. The first retreat, known as the "Moscow Division of the Emperor Alexander II. Protective Establishment for Railway Servants," is situated only a short distance from the famous Napoleonic battlefield of Borodino, which is the name of a station on the Moscow-Onest Railroad. It lies in a woody neighborhood near the river Moskowa, in a fine park, having a sandy subsoil, insuring its healthy character. There are 16 dwellings arranged for 4 families each, besides a house for single men, a school for 38 children, a small hospital, a church, a Russian bath house and a laundry. The houses are from 80 to 100 ft. apart. The quarters assigned to each family seem a little restricted, from our point of view, consisting of kitchen, one room for general purposes and a store room and cow stable. The cow would seem to be from this account the most privileged individual of the family. Every family has a small garden and each of the houses a piece of land large enough to make a vegetable garden which will supply all the occupants.

The railroad managements are expected to supply their nominees with means to reach the retreat, and each family is allowed on arrival $40 for fitting up; and furthermore each retired employé is provided from time to time with the uniform of the retreat and a supply of other clothing, mattresses and bed linen. The management of the retreat provides for the lighting and heating of the dwellings and supplies a certain amount of rations consisting of flour and coarsely ground maize, somewhat similar to our hominy.

Land is placed at the disposition of each pensioner for farming, and they are allowed to practice any trades of which they may be capable.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

In another column will be found a letter concerning the Burton stock cars. We have been unable to find a full report of the testimony in the Burton Company's case before the Commission and so do not know just how far they succeeded in breaking down Mr. Stone's testimony; but it is immaterial. We did not say that the railroad had made a *great* point; we simply referred to the fact that it was a point. The presence in a car of a single post to hitch animals to, not to mention troughs, partitions, water pipes and other things, may be an inconvenience such as a railroad would be warranted in either getting rid of or in seeking compensation for.

Quite likely the railroads have, as intimated by the Commissioners, charged more than they ought, but that does not affect the principle on which the charge is based. A partition, feeding-box, or in fact anything that can be moved, detached or broken in handling or become a source of additional care or bother in the care of cars or the discipline of men, is a feature which railroads are not only entitled but bound to consider in calculating cost of service. So simple a thing as a grain door has made no end of trouble, and a small, plain ice-box in the upper part of one end of a car makes it less desirable to the men who load cars, and they shun such when they can get better. One reason why freight men like cars of uniform shape and capacity, is that many loads are transferred from other cars, and it is annoying to have to send out in two cars what is received in one. Concerning refrigerators, Mr. Burton answers his own question; if roads do not charge for additional weight that is no reason why they should not. Of course Mr. Stone's position is explained chiefly by the fact that he (or any manager) naturally and rightfully desires to use his own cars rather than to hire other people's; if he wanted the Burton improvements he would probably prefer to have them fitted to his own cars or to buy outright what he needed. If railroads prefer inhuman to humane methods of carrying live-stock, or if railroad officers abuse their public trusts by reason of their private interests in stock yards and the gain to such interest by such abuse, they should be proceeded against directly and not in a roundabout manner.

THE CHATSWORTH DISASTER.

Once more we have to chronicle a startling calamity. Any attempt to set forth a picture of the pain and misery caused by it would seem irreverent. The simple statement of the figures, 87 killed, 150 or more wounded, is enough. The man whose heart has not ached at the thought of what these figures mean is a brute. For him we do not write.

But what are the lessons to be learned? The writers of the daily press, as usual, demand severe punishment for the present case, and tell us just the remedy; but their suggestions are as impracticable as ever. They want watchmen at all bridges, but do not explain how a road is to be made profitable with such an expense item; they want iron bridges and stone culverts, but have nothing to say on the subject when praising a road for reducing its fares and giving benefits to the public; they say this train should have traveled more slowly, but cannot tell how a road is to comply with such a demand when its competitor makes quicker time. They refer in scathing terms to the past financial vicissitudes of the road, and say, doubtless with justice, that during its connection with the Wabash system it was managed so that its profits went into the wrong pocket. And yet the Toledo, Peoria & Western is no worse and no better than numbers of other roads with thousands of miles of track. Most likely it is fully up to the average. It has wooden bridges over short openings; but so have important trunk lines. It does not afford night track walkers; but neither do many other roads with twice or four times the business of this one. It runs heavy cars at the rear of trains, and places the weaker ones in front, where the heavy ones can crush them; but older and larger roads set the example. It runs "double-headers" and leaves the forward engineman wholly powerless to handle the train brake in disregard of the warning of the Carlyon accident some years ago; but numbers of "first class" roads keep it company. It runs trains in the blackness of night and without these safeguards as fast as it would in the brightness of noonday; but what superintendent has the courage to be so old fogyish as to slacken speed at every culvert?

The "commuters" who ride out of New York across the Jersey meadows are every autumn exposed to the dangers of wooden culverts and burning grass. And so we see that the lessons to be learned are not for this road only, but for responsible officers on probably every road in the country.

The more important of these lessons involve questions concerning the speed of trains and the guarding of bridges, and the relations between the two. With a stone arch bridge, the road over it is nearly or quite as safe as an ordinary embankment, and, if there is a suitable parapet, more so; while, on the other hand, the trestles on a railroad may be so high or so numerous as to demand a continuous watch, or, in the case of very infrequent trains, an inspection just previous to the passage of each one of them. In proportion as these principles are disregarded, trains must be run with speed under control, or incur certain disaster *sooner or later*. As for stone and iron bridges, and the substitution of such for wooden structures as fast as the finances will permit, it is probably true that American railroad managers are fully as progressive in this as in any one line of endeavor. Most managers, with much or little money to spend on improvements of road, would see that bridges had their full share of attention. Numerous roads suffer from the manipulations of speculators who control stock; and extravagant follies, such as palatial cars for officers and ruinous expenditures for advertising or ticket commissions, frequently impair the integrity of the good record made by a board of directors; but, in the main, the true principles that ought to govern the expenditure of earnings do govern. The exigencies of competition and of economical working compel it.

The guarding of the track is a complicated question. Very few roads even of the wealthiest, keep patrolmen constantly on duty. On many roads freight trains are more numerous than passenger, especially at night, so that the chances of a great disaster like Chatsworth are greatly lessened. The freight trains which have been wrecked by weakened culverts in the past ten years could very likely be counted by scores; and the number of bridges in lonesome places that have been discovered burning (but not weakened) by passing trains would doubtless also be large; so that the law of chances is, after all, a large element in past immunity. Fires and washouts discovered by pedestrians or neighboring residents are also frequently reported: and the noticeable number of derailments of late years from insecure bridges on roads in the desolate regions of the Southwest emphasizes the fact that roads in well-settled localities have in the residents along their lines an important element of security. But admitting that track-walkers cannot be afforded for 24 hours a day—and few will claim that such a road as the Toledo, Peoria & Western ought to spend from $100 to $200 per mile per year for such a purpose—how shall the running of trains be made safe? Even with the track-walkers, nothing but a strict and carefully-arranged system would answer. In the present case a man ordered to examine bridges immediately previous to the time for the arrival of each train, might have done his duty and still the catastrophe occur; for the train was two hours late, and a fire might have burned to a fatal extent in that time. And here we may note that whatever may have been the degree of vigilance the engineman exercised, a smart shower for a half hour before his arrival might have extinguished the fire to such a degree as to deprive him of what little warning he did have. The exceptionally parched condition of everything combustible on or near the right of way may indeed have made it the reasonable duty of even a poor road to employ special bridge watchmen at this time, whatever may be right in ordinary times. The evidence of witnesses familiar with the locality, taken and sifted by the state commissioners on the ground, will have to determine this point, and whether or not the men in charge of the track had paid reasonable heed to the warnings given by the numerous fires that had occurred.

Regulating the speed according to the degree of danger is a principle recognized on every hand, though with the most variant views as to it application. Cheaply built roads with light traffic run trains at less than a third of the speed made by the most improved engines, drawing the best of cars, over the superb track of the trunk lines; and these trunk lines themselves recognize the propriety of restricting their branches and less important lines to a limit which could not be thought of on the main road. There can be no question that on an unguarded road a train running at night would much better increase its speed on the safer portions of the road very materially if it could thereby insure safety at bridges and high embankments than to keep up the regular speed over every portion. There are plenty of roads, though, that cannot, without sacrificing their business, follow even this reasonable plan, for they have culverts of the Chatsworth kind at every little water course; and it is a pertinent question in this connection whether the very poorest road, if it intends to run passenger trains at all, ought not to have a sufficient share of its water ways provided with culverts either wholly of masonry or with masonry abutments and iron stringers, so that at least the larger portion of its road may be safe from fire. We see that wooden trestles are numerous on the Toledo, Peoria & Warsaw; perhaps this engineman could not have assured himself of a safe track that night without taking a whole night to go a hundred miles. Few, if any, roads, however, slacken speed at short bridges except where they are admittedly weak (and this one was strongly built), and so, as we have said, the ill-fated road under discussion should in this respect bear no more odium than scores of others.

There is no question that familarity breeds contempt, even of danger, and at this distance it seems as though nothing else could explain the non-action of the people who saw the blaze from Chatsworth in the evening. Whether or not any employé of the railroad saw it is not stated, however. It is familiar knowledge that engine runners become careless of sights which would induce a novice to apply the brake instantly. Roads running fast trains without an adequate system of distant signals often rather pride themselves on enginemen who are strangers to fear. It has been said that on many roads the runner who should slacken at every red signal coming up before him would lose time and forfeit his situation; and, doubtless, roadside fires have in places become so common as to be almost unnoticed.

An Englishman familiar with the solidly built permanent way of his country would doubtless say unhesitatingly that no such shabby road should be permitted to run trains; but American critics, before taking up this strain, should bear in mind that people are still clamoring for just this kind of road, in the face of previous warnings of various kinds. Every week, if not every day, we hear of towns and counties voting money for new roads, and as most of these municipalities are poor, they naturally favor the cheapest kind of a road that can be made to pass muster. If this tendency is to be corrected, a big job in educating public opinion must be undertaken by somebody.

The heavy sleeping cars at the rear of the train and the absence of a power brake connection to the forward engine are serious features and may well be responsible for much of the slaughter. No one claims that stouter cars would not have been wrecked or that they would, if in the front portion, have protected both themselves and those behind them; but it has been shown, conclusively, that light cars in front of heavy ones in a derailment of this kind, or, in a collision, do suffer disproportionately. Railroad men acknowledged this long ago, in substance, by their carefulness to always place four-wheel and other light cars in the rear portion of freight trains, and nothing but a feeling of confidence that collisions will not come to *their* road can explain their willingness to still run heavy passenger cars behind lighter ones. The fireman of the leading engine said that if Sutherland had had the air brake he could have stopped the train, though his other statement that the fire was first sighted when only 200 ft. from it conflicts with

this, and his excitement may have led to his making erroneous estimates in both statements; but every one knows that in the precious moments during which a whistle is being pulled, sounded, heard by the second engineman and acted upon, a train may with a good brake be materially slackened. In five seconds a train at 40 miles an hour runs nearly 300 ft., which is from one-fourth to one-third the distance in which it ought to be brought to a standstill.

It has been suggested that the engineman would, if he had seen this blaze near a regular bridge, have taken more prompt means to stop; that so insignificant a culvert was, as it were, regarded as solid ground by him; but an engineman who does not realize that a ten-foot gap may hurl him to eternity as surely as one ten times that length must be thoughtless indeed; and if in this case he did not know the exact location of each bridge of this kind the company would seem to be blameworthy for setting him to run a night passenger train. To have divided the train would most likely have saved the second section, but it would have introduced other and familiar elements of danger.

To sum up, it must be said that notwithstanding the special precautions taken, the watch was still lacking in vigilance, though by the aid of hindsight the officers of the Toledo, Peoria & Western can now see this as well as any one. The placing of the light cars where they were at the mercy of the heavier ones, like egg-shells in a vise, and the neglect to connect the air-brake to the forward engine, were certainly in plain disregard of fair warnings.

Railroad Tie Preservation.

The question is often raised whether we should really gain much by preserving railroad ties through chemical processes, because the destruction by the cutting action of the rail and by the respiking where the rails have got out of gauge, or by splitting, is equally important, if not more so, than the rotting of the tie.

Of interest in this connection are the following tables showing the causes for which ties were removed on the Cologne-Minden Railroad in Rhenish Prussia for the 5½ years succeeding 1877; the ties having been with few exceptions preserved either with chloride of zinc or creosote.

TABLE OF REMOVALS.

Total.

	Total taken out.	Of which were destroyed by			
		Rotting.	Re-spiking.	Splitting.	Cutting.
Oak	6,145	1,200	1,746	1,338	1,861
Fir	2,777	689	526	146	1,416
Sum	8,922	1,889	2,272	1,484	3,277
Per cent.	100	21.1	25.5	16.7	36.7
From Main Line.					
Oak	3,898	198	1,189	1,115	1,396
Fir	2,164	357	426	103	1,278
Total	6,062	555	1,615	1,218	2,674
Per cent	100	8.2	26.7	20 9	42.2
From Side Tracks.					
Oak	2,247	1,002	557	223	465
Fir	613	332	100	43	138
Total	2,860	1,334	657	226	603
Per cent	100	46 6	23.0	9.3	21.1

At first sight the enormous proportion of ties destroyed mechanically, especially in the main line, as compared with those removed on account of rotting, seems overwhelming testimony to the inutility of tie preservation. This impression is not entirely sustained by a more careful examination of the mechanical forms of destruction. Splitting is probably little if at all affected by the use of any preservative on the wood. What is called destruction by re-spiking is evidently, from the language of the report, the local destruction of the tie in the neighborhood of the rail from changes of the spike due to its failure to hold the rail to gauge. Both this and the cutting, or about 70 per cent. of the removals from the main line, would be very much affected by any treatment of the wood which would make it decay or soften more slowly. With the ties removed directly on account of rotting we have then in the main line 79 per cent. of the ties more or less affected by any agents which will keep them from rotting.

On the other hand, the statistics above given represented track in which the rail base resting on the tie is much smaller than is usual with us. The Prussian State Railroad standard roadbed section, with a rail 5½ in. high, has a rail base 4 in. wide resting on ties at 36 in. centres. The natural consequences of such practice are of course very rapid cutting of the tie and frequent respiking on curves. The remedy for this on those German roads which have not had resort to steel ties, which are still relatively to preserved fir the more expensive even in Germany, is to put in a bearing plate—practically our old clickety-click plate chair. Here, where our practice has developed by a broader rail base and more frequent ties a bearing surface generally 40 per cent. in excess of the German one for a corresponding traffic, the removals on account of mechanical destruction of ties cannot be nearly as large a proportion of the total as in Germany.

But after all the main question is, is the increase of life by preservatives sufficient to pay for preserving? The answer must be sought in the relative number of preserved and unpreserved ties taken out in a given time under the same conditions. Now the German returns, which are certainly as complete as those of the railroads of any other nationality, show that after 13 years, of unpreserved oak ties 84.9 per cent. have been taken out, while of the preserved ones only 12.1 per cent. have gone. Fir ties in the same period show losses of 100 per cent. and 41.8 per cent. for unpreserved and preserved ties respectively; and, while all the unpreserved beech ties disappear from the track within five years, only 25 per cent. of the preserved are gone after 13 years. The testimony of all the statistics as to beech is that its durability against all the elements of destruction is increased from five to six times by preservatives. Unless the impregration of beech proves unduly expensive, which may very possibly be the case, its great durability when preserved (running well up towards that of preserved oak) may make it profitable tie timber in certain sections of the country where it is abundant.

With our own better bearing surfaces for rails, there can be little doubt, however, that where hemlock and spruce ties can be had for one-third the cost of oak, or southern pine, as is the case in large sections of the country, their use impregnated with chloride of zinc or creosote will well repay the cost of the operation. The latter can be done thoroughly for 25 cents a tie, and will make the life of a hemlock or spruce tie very nearly equal to that of oak as shown by the German statistics.

Fixed Signals for Protecting Trains at Stations.

The Gould-Tisdale signal, shown on another page, is an evidence of the attempts constantly being made to evolve a signal system which shall be so simple, cheap and perfect as to deserve wide adoption. Every day shows more and more the need of additional safeguards in train working, and inventors have still a duty of tilling the field with perseverance. The Union track circuit system is excellent, but many roads which feel that they cannot afford that, still desire a certain degree of protection, and are anxiously looking for the device that shall meet their requirements. With the constant and important discoveries in electrical application and improvements in electrical devices it is not unlikely that the track-circuit system will be materially improved, especially as it is now in use by enough different roads to render the experience with it increasingly instructive and stimulating to inquiring minds; but an effective station signal to protect passenger trains while standing and freight trains while switching, is still a serious need, and should be striven for till found. There is, of course, liability to failure in any mechanical or electrical device, especially the latter. Lightning is always going to take an interest, and often a lively one, in everything connected with this little planet, and it probably will be some time before we can use tame electricity with complete assurance that it will not occasionally touch noses with the wild article outside the fence.

The question of the best position for a semaphore arm in order to show "clear" is at once suggested by this signal, as it never gets within less than 45 degrees of the perpendicular. The old idea of a semaphore was: perpendicular, go ahead; horizontal, stop; half way between these, go ahead cautiously. The "all clear" position has gradually been changed, so that it is in many cases shown by a position as much as 35 or 40 degrees, if not fully 45, from the perpendicular. This has resulted from the desire to have the arm always distinguishable from the post, and also to conduce to mechanical simplicity; and a "cautionary" position is thus made unavailable. It is doubtless now the general opinion that "caution" can be best shown in some other way than by a third position of the arm. The pivoting of the arm at its centre instead of at one end is perhaps an objection to the Gould-Tisdale signal, experience will tell. A post often answers for a landmark, assisting the engineman to get his bearings—make sure that his eye is directed to exactly the right spot—a few seconds earlier than he could with an arm alone, and apparently hanging on nothing.

It is desirable to have station signals a good distance from the point where the protected trains are to stand; but this often puts them out of sight of the one who operates them, thus depriving him of certain means of knowing that the signals he gives are actual and effective at the distant end of the line. A cross in the wires might cause the Gould-Tisdale indicator in the office to show clear when the signal itself showed danger, which would be inconvenient though not necessarily dangerous. Derangement of the magnet might cause the signal to show clear when the indicator showed the opposite, which *would* be dangerous. The desideratum is a signal so arranged that the indication in the office shall not be given until the outdoor signal actually has moved to the danger position; this has been done both by an independent circuit and by apparatus which gives the return signal over the same wire that works the arm or disc. Even this, of course, is subject to derangement by lightning and other contingencies; but certainly nothing less than this should be accepted if it can be had within reasonable cost. A good degree of protection can, however, in very many cases, be secured with the Gould-Tisdale signal as it is. Many station signals can be placed where they are in full view from the office or switch (except in times of fog and still be vastly more effective as a warning to enginemen than would be a signal, however bright, or large, or highly elevated, if displayed *at* the point of danger. A chief objection to the time-honored ball at the top of a pole or mast is not only its uselessness in foggy weather, but also the fact that the runner must many times make an effort, slight though it be, to look at it; whereas a distant signal can be properly placed so that it shall in a measure thrust itself upon his vision: unless, indeed, he shuts his eyes, or rides backward. No road, we believe, trusts any block signal, electric or otherwise, so far but that it maintains in full force the old rule that a man must be *sent out* with a flag. Many fixed signals which more or less fully protect a switching yard, are habitually depended upon by the switching men without other safeguard; but the rules will generally be found to provide that in case of collision at such a point somebody will be technically to blame for not having sent a hand signal. But it should be kept in view that a perfect system of distant signals will dispense with "going back to flag;" and of course we are all more or less zealously aiming at perfection.

Government Control of Productive Works.

The question of government control of railroads can hardly be called a burning one in this country, but it is well to note from time to time some of the experiences of governments in business enterprises.

The utter failure of the manufacturing enterprises of the English government, in financial results at least, as contrasted with the success of commercial shops in the same country is noticed in an article entitled "The state in its Manufacturing Aspects," in the May number of the *Westminster Review*. It seems that England's investment in shops is valued at £15,178,000 and she employs 40,000 men, paying a yearly wage of £2,266,100. Yet notwithstanding the perfection to which the British civil service has been brought and the long experience in such works, Parliamentary committees reported that "alike in the general principles of management and in the merest matters of detail the system was inefficient. * * * The supervision of labor is unsatisfactory, and idleness and incompetence are practically unchecked." Under these circumstances it is not amiss to compare the difference in cost of two vessels, the conditions of which are said to have been as nearly as possible relevant and parallel. The hull of one vessel built in the government yard at Chatham, cost $441.42 per ton, and the engines $74 per ton, while for the vessel built by contract at Glasgow the costs were $378.36 and $63.54, respectively.

The editor of *Engineering* unburdens his mind on this subject as follows:

The wholesale failure of torpedo boats on speed trials, and the report of the Ordnance Inquiry Commission just issued, are events well calculated to throw a cloud over the relics of our prestige abroad and to cause humiliation to every Englishman. They alike cast discredit on our manufactures and our powers of organization, on our methods of offense and defense, and on the heads of departments who are responsible for spending the vast sums annually drawn from the pockets of the taxpayers. Possibly we are not worse than our foreign neighbors, but a partial light has been thrown upon our shortcomings sufficient to bring into strong relief a portion of the "Ignorance and Incapacity" that has in charge our guns and ships, our Army and Navy, our soldiers' lives and the nation's pocket. Ironclads built at vast cost, and nearly always requiring repairs after a gale, are fitted with heavy guns, which those responsible for their design and manufacture insist upon being the very best that skill and money can produce. On this point the Commissioners say that the notorious failures of the 45-ton guns point to conclusions of the deepest importance. "They show that a whole class of guns, fifteen in number, and inferior in power only to the 80-ton and 110-ton guns, turned out unfit for their purpose. What were the reasons for their unfitness is a scientific question on which we offer no opinion. But the gravity of the error which has been committed is rather increased than diminished by the fact that it seems to have been committed deliberately and after warnings as to its existence."

How different this is from the record of the Fort Pitt Gun Foundry that had no failures in the guns it turned out:

The last results of the manufacture of guns can hardly be considered as satisfactory. Guns are now produced of the weight of 110 tons. They have a calibre of 16 in., and a length of 44 ft. and upward. Their charge consists of 1,000 lb. weight of powder and a projectile weighing nearly a ton, which cost together about £150, though the price varies according to the material of which the shot is made. The gun itself costs about £20,000. After firing 150 rounds it will require relining with a new steel tube. This would render necessary its removal to Woolwich, where the operation would occupy a considerable time and would cost a large sum of money. It seems to us that the result in this case is hardly equal to the expenditure, and that it is unfortunate if nothing better than this can be devised.

In addition to the loss, inseparable from the ignorance and incapacity of a theoretical and slightly bumptious management to which all government works seem liable, there is the further economic danger which arises from the effort, certain to be made, to increase the power and influence of a department by increasing as much as possible its factories. This effort of a department for a commanding position, without regard to its ability to successfully manage the works, is likely to be but inefficiently controlled by our legislators, as witness the history of the government gun factory at Washington, where, under the plea that government should not be dependent on contractors, a gun-finishing shop is building which is entirely dependent on contractors for the tubes and rings which go to make the guns, while the contractors' lack of a finishing shop provides that no commercial use of the machinery necessary to fabricate the tubes and jackets shall be made aside from supplying our government, as they are the only customers likely to want rough turned forgings of that kind. As a consequence, the government alone must pay for first cost, interest and maintenance of the machinery. No arrangement more thoroughly in defiance of the economic principles which govern commercial manufacturing could be found, and this would probably be a fair sample of the management of our railroads if they fell into the hands of the government.

A "Taxpayer" propounds the following questions in a communication to the Nashville *Banner*.

The projectors of the —— railroad are asking Davidson County to give (the word "give" is used advisedly) them $500,000. Would it be considered impertinent for one of those who are expected to do the paying to ask who are the projectors of this road? What is the amount of the capital stock of the corporation? How much of this has been paid in cash? What is the length of the road from Memphis to Nashville, and from Nashville to Bristol, and what is the estimated cost of the road? Further, is there any assurance that a competiting line will be gained by this road? The time has passed in this country when it is necessary to call upon the counties to aid in building railroads which have real merit. There is sufficient capital seeking investment to build any railroad which promises to be profitable.

While not asked—in a way to elicit an answer—so often as they ought to be, these are perfectly fair question and ought to be republished occasionally to cool the ardor of thoughtless persons. They are pertinent and well put, and should be welcomed by really honest and enthusiastic projectors. It may not be always easy to convince people that they should vote public money to a new railroad, notwithstanding the remoteness of any prospect of profits; but it would be well if promoters of new schemes were oftener compelled to make the attempt.

The New York Central has, if we may believe the New York *Sun*, the distinction of being the first American road to receive a voluntary and hearty testimonial from a titled traveler from Europe. At least we do not recollect having seen any such hearty and outspoken commendation as the *Sun* reports from the lips of the Earl of Aberdeen, who has just been around the world. The Earl was pleased chiefly with the Wagner cars and the four-track system, and says there is nothing elsewhere to compare with these facilities. He refers to the high speed and other things, but, of course, we do not claim to beat the English in every feature. American engines can take a train over the ground at a lively rate, but are not "let out" as a general thing except in the case of special trains wherein some "magnate" must be carried a thousand miles in a thousand minutes to conclude some important trade in stocks (which shall afterward fall through). The most creditable thing about high speeds in this country is the long distances for which they are kept up; and English engine drivers are not to blame for stopping when they come to the jumping-off place. A four-track road for 300 miles is, indeed, unique; and a natural plain stretched in a straight line for that distance among an otherwise broken country is also a thing for which the New York Central may be thankful

A fast freight line which really deserves the name (in this country at least) is, according to a Cleveland paper, now running on the New York, Lake Erie & Western, which, with its controlled Western connection, the Chicago & Atlantic, is running a regular train through each way daily between New York and Chicago in sixty hours. The distance is 986 miles, which would require a speed of 16½ miles per hour, including stops. As there must be from 7 to 12 divisional stops, which probably average a half hour or more each, and numerous other stops for water and grade crossings, the speed when running must be well up to 20 miles an hour, which for nearly a thousand miles is very creditable. Doubtless, the cars are not heavily loaded. The west-bound traffic includes a good share of lightly loaded cars, and the east-bound trains probably confine themselves to high class freight. The paper referred to says the time of these trains is to be further reduced to 56 hours. The best time hitherto made by regular trains on the trunk lines is probably nearly twice that: at least we have not heard any of them boast of less than 4 days for a shipment between the two cities.

The receipts of grain and flour at Buffalo by lake for the month of July show an increase over last year of more than 1,700,000 bushels, and were only equaled once in the last 20 years. In 1880, the grain and flour reduced, was 14,645,000 bushels received by lake, and this year it was 14,270,000. For the five years, 1881 to 1885 inclusive, the average for the month was 7,960,000 bushels. For the season to Aug. 1 the receipts were 47,464,000 bushels, against 40,888,000 last year, 53,925,000 in 1880, and an average of 23,701,000 for the five years, 1881-85.

The shipments by rail from elevators have been, in bushels:

	1887.	1886.	1885.	1884.
Month of July.....	3,102,486	1,886,482	1,435,956	1,469,449
Jan. 1 to June 30...	15,495,743	10,881,379	5,988,090	4,269,464

By canal the shipments have been, from the opening of navigation to June 30:

	1887	1886.	1885.	1884.
Grain, bushels....	22,001,356	18,912,850	12,537,013	13,138,451
Flour, barrels	506	621	832	1,423

The Chicago, Burlington & Northern, which it has been proposed to consolidate with the Chicago, Burlington & Quincy, which controls it, seems to have in it influential parties who are not particularly interested in the older road. It is stated that questions concerning rates and traffic which have hitherto been settled wholly by C., B. & Q. officers are now to be referred to arbitrators, and that the Northern is to be managed more directly with regard to the profitableness of its own lines. At last accounts the reduction of Chicago-St. Paul rates, which this road was said to contemplate, had not been put in force. The older roads threatened to retaliate by reducing rates in the Chicago, Burlington & Quincy's territory in Iowa and the Southwest.

The Chicago, Burlington & Quincy encourages its shopmen to make themselves proficient as a fire brigade by offering prizes to the best drilled company. There are hose companies at Aurora, Galesburg, Burlington, Creston, St. Louis and other places, and the first prize this year went to Galesburg Company No. 1. Aurora No. 1 took second. This is a sensible method of profit sharing, small though it be. If additions to wages (or additions to men's pay in any shape) were never granted except in connection with a demand for additional service or fidelity, the employés would, nine times out of ten, be fully as well satisfied, and in many cases more so than under the common plan; and the employer's interests would doubtless be more surely advanced every time.

It is reported that the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul will put on fast trains between St. Paul and Chicago to compete with those of the Minnesota & Northwestern, lately established. The older roads had limited trains, running through in about 12 hours last summer, but discontinued them, doubtless finding them an expensive luxury. The through trains now take from 14 to 18 hours to make the trip. Possibly the present plan simply contemplates the acceleration of the existing trains.

Theory and practice sometimes differ, it would appear, in England as well as in other parts of the world, as will be seen by the following from the *Engineer*:

The porters at the most largely used station of the London, Chatham & Dover Railway—namely, the Ludgate Hill barn—are still the least disciplined and least creditable lot of porters in South London stations. Their behavior on the arrival of a train remains as disreputably indifferent to the requirements of passengers as ever, and is infinitely inferior to that of the Southwestern porters at Waterloo.

The New York Central has settled the car-heating question for itself, for the present at least. The cars of the Central and leased lines will be equipped with the Martin heater, and work is to begin at once.

Record of New Railroad Construction.

Information of the laying of track on new railroad lines in 1887 is given in the current number of the *Railroad Gazette* as follows:

Americus, Preston & Lumpkin, from Americus, Ga., east to Abbeville, 62 miles.

Canastota Northern, McConnellsville to Camden, 5 miles.

Chicago, St. Paul & Kansas City, since July 15, from Des Moines, Ia., 12 miles.

Denver & Rio Grande, from Rock Creek westward 51 miles; from Montrose to Uncompahgre, 16 miles; from Trinidad to Elmoro, 4 miles; total, 71 miles.

Erie & Wyoming Valley, from Dunmore to Scranton, 2 miles.

Marietta, Columbus & Northern, from Amesville to Sharpsburg, 4 miles.

Minnesota & Northwestern, since July 1, from a point three miles south of Freeport, Minn., 10 miles westward.

Missouri Pacific, since Jan. 1, including Denver, Memphis & Atlantic, hitherto unreported, 250 miles. The mileage completed was from McCracken, Kan., to Colorado state line, 138 miles; Chetopa, Kan., to Larned, 272 miles; Bald Knob to Wayne, Ark., 45 miles.

Suburban Rapid Transit, from 143d street, N. Y. City, to 164th street, 3 miles.

Wilmington & Weldon, Clinton to Warsaw, N. C., 13 miles and from Rocky Mount to Spring Hope, 19 miles; total, 32 miles.

Last week a new mileage of 16 miles was reported on the Troy branch of the Cincinnati, Hamilton & Dayton. It should have been 2 miles.

This is a total of 451 miles for the week, making 3,214 miles reported thus far for the current year. The new track reported to the corresponding date for 16 years has been:

	Miles.		Miles.		Miles.		Miles.
1887	3,214	1883	3,078	1879	1,746	1875	613
1886	2,655	1882	5,984	1878	1,049	1874	962
1885	1,472	1881	3,459	1877	1,013	1873	2,028
1884	2,104	1880	2,853	1876	1,273	1872	3,962

This statement covers *main track only*, second or other additional tracks and sidings not being counted.

NEW PUBLICATIONS.

China. Travels and Investigations in the "Middle Kingdom." A Study of its Civilization and Possibilities; with a glance at Japan. By James Harrison Wilson, late Major-General United States Volunteers, and Brevet Major-General United States Army. D. Appleton & Co.: New York. Octavo, 376 pp., and folding map. Index. $1.75.

General Wilson tells us that in the spring of 1885 he began to think of China as a field for railroads, but he found information of the kind he needed so hard to get that he decided to go and see China for himself. His journey began in September of 1885, and occupied nearly a year. General Wilson's services to the country as well as the mission on which he went secured for him certain consideration, and opportunities for knowing the temper of the ruling men of China such as travelers can seldom have; and the training of his life made him an unusually competent observer. Such of the results of his observations as he has chosen to give to the public are in the little book before us.

His conclusions are that the Empress Dowager (who is regent) and the father of the Emperor are in favor of building railroads, furnaces, rolling mills, telegraphs and ships, and of opening mines. Unquestionably some of the most powerful advisers of the throne are so. They realize the pressing strategic need of railroads as well as their industrial importance to the country. On the other hand, there is a great reluctance to contracting debts to foreigners or to giving up any control of public works. "They will not for the present borrow money on the credit of the government or a pledge of its revenues for the purpose of paying for such works, nor will they grant subsidies or concessions to foreigners." But they will build railroads and other public works when they are shown that this can be done by their own money raised by private subscription and by their own labor under fair and honest foreign expert supervision. But "of course it is impossible to predict with certainty when China will move in specific enterprises, what will be her direction and policy, or what men and nation will become her guides."

China is poor, but she could borrow 100 millions on the government obligations, and it is estimated that as much could easily be raised, by private subscription, as fast as required for building railroads, if proper legal protection could be given to the undertakings and to the investors.

There are eligible routes now ready which would pay fair profits to roads from the start; and, in the opinion of General Wilson, 100 million dollars would, under good management, supply China with a framework of railroads that would be invaluable in case of war and which would from the first pay interest on the cost and leave a surplus for the public treasury. "If, however, the cost should reach such a sum per mile as the railroads built in Japan under English auspices, in the construction of which pounds were spent where dollars would now do the work, the railroads produced could not for years to come, except in a few special cases pay their working expenses and interest."

In spite of the stupid brutality with which our people have lately treated the Chinese, Americans seem still to be regarded by them with some favor, and General Wilson urges that it should become a duty of our diplomatic and consular agents to push reputable and capable Americans forward for employment in China as experts in the arts and sciences, contractors for public works, instructors in the army and navy, and advisers to the provincial and Imperial governments. We all know of what vast importance to England such a policy has been in other semi-civilized lands, where she has never neglected the chance to get in the point of the wedge.

Although coal and iron are found in nearly every province of China, and the extent of the workable coal beds and the quantity of coal contained in them are greater than in those of any other country of the world (Richthofen), yet she has no iron industries and there is but one coal mine in the empire furnished with European machinery and worked under European supervision. This mine at Kaiping, 80 miles east-northeast of Tientsin, mined and sold 130,000 tons of excellent bituminous coal last year, but is not a financial success. Here is the only railroad in China, a well-constructed, light, standard-gauge road, seven miles long. The rails are 35-lbs. steel (or 30, both weights are given), stone ballast and everything first-class. There are two English locomotives, and one, the first ever run on the road, which was built by a smart young English engineer, at the company's works at Kaiping, out of old material. It was built surreptitiously. The boiler is a second-hand portable one of English make; the cylinders, 8 in. × 15½ in., were from an old winding engine; the wheels are 30 in. chilled iron, from Whitney & Son, Philadelphia, bought as scrap; frame, channel-iron, from the head-gear of No. 1 shaft; springs and all other work made at the colliery. The weight on drivers is 6 tons and on leading wheels 3½ tons. The cost of construction was about $650 for labor and new material. This engine has run over 12,000 miles. The railroad has a total fall of about 70 ft.; maximum gradient of 1 in 100; sharpest curves, 1,500 ft. radius, except in yard; sleepers, elm; ballast, broken limestone. There is one tunnel of 300 ft.; one arch, 20 ft. span; one iron girder, 10 ft. span; one Warren girder, 30 ft. span, and several culverts. The daily traffic is 600 tons of coal, 100 tons of limestone, besides pottery and sundries, and about

160 passengers, who pay five cents for the seven miles. "Notwithstanding the fact that this road is in daily operation, runs smoothly, and is a beautiful model of what a light railroad should be, its existence has until lately been ignored by the government," and, so far as known, it has never been seen by any important officer of the imperial or provincial government.

THE SCRAP HEAP.

A Second Tank Accident.

Workmen on the extension of the Chicago & Northwestern Road near Norway, Mich., last week completed a new water tank and filled it with water for a test. While they were standing near by, the timbers gave way. Six men were killed, and six were seriously and others slightly injured.

Paris Elevated.

The scheme for an Elevated Metropolitan railroad in Paris has been defeated in the Chambers; 258 members voting that it is not of public utility, against 222 in favor of it.

Insurance of Freight against Fire.

The Minister of Commerce of Austria has presented to the counsel of the state railroads a proposition requiring the Austro-Hungarian roads to insure against fire merchandise in transit, the insurance to begin from the moment of receiving the freight in the warehouses of the company. The expense of this insurance is to be taken from the shippers in the form of a supplementary freight, or in warehouse charges. This proposition rests on the assumption that the present arrangements are somewhat vague and cause suits for losses, and it is claimed that it is better to fix the liabilities exactly.

The Buda Pesth Chamber of Commerce has addressed to the Navigation Company of the Danube and to the Director of the Hungarian state system a memoir setting forth that the only solution that will be satisfactory to the shippers will be one that will oblige the transporters to insure merchandise not only while being carried, but for all the time that it is in the companies' warehouses.

A Railroad in China.

A placard fixed within the last few days on the walls of Tien-Tsin has brought home to the people of China for the first time in the history of the Empire the democratic doctrine of expropriation. The placard announces that a railway is to be built between Tien-Tsin and Takou, and it is composed with a view to give some confidence to the panic-stricken inhabitants brought face to face with this dire calamity of modern civilization. The first care is for their lives, their next for their property. They are assured that when the line goes through a village, foot passengers need have no fear. A fair price is to be paid for whatever land is required, and the land itself is to be released from the payment of all taxation. The poster goes on to assure them that opposition to the decree involves risk to the obstructors. Penalties are hinted at, and peace and obedience recommended. And this railway is only to be forty-four miles long, passing through a flat country with no engineering difficulties.—*Pall Mall Gazette.*

Spontaneous Combustion.

A Buffalo paper says: "There are plenty of authenticated cases of spontaneous combustion of various materials. During the recent remarkably hot period no less than three occurred in New York Central freight cars at East Buffalo. In every instance the fire was in bales of shoddy, of which considerable quantities pass through here to factories in the East. A car would be discovered full of smoke, and the smoke found to be emanating from a bale of this stuff. The fire would be at the very heart of the bale, which when torn open would burst into flames. The special susceptibility to spontaneously ignite is attributed to the use of some chemical in its preparation."

Not Reasonable and Just.

High fare—A handsome girl with a stylish hat.—*New Haven News.* The Commission must order a reduction.

A Brakeman who Blushed.

"Putnam, change cars for Norwich and Worcester," cried the brakeman this morning as a train slowed up at Manchester. Every one in the car looked and smiled, and the brakeman blushed. "By Jove," said he quietly, after he had corrected himself, "I was thinking of a girl just then who lives in Putnam.—*Connecticut Romancer.*

Opening of Government Lands to Settlers.

The Secretary of the Interior has revoked the order of withdrawal of indemnity lands for the benefit of the Atlantic & Pacific Road, and in a letter to the Commissioner of the General Land Offices has directed that they may be restored to settlement under the Pre-emption and Homestead laws. The Secretary's reasons are given at great length. It is stated that between 25 000,000 and 30,000,000 acres are involved in this decision in the case of the Atlantic & Pacific alone. The order also applies to all of the other railroads named in the Secretary's rules of May 23 last, except the St. Paul, Minneapolis & Manitoba, the Hastings & Dakota, the St. Paul & Pacific, the St. Paul & Sioux City, the Sioux City & St. Paul, and the Winona & St. Peter. These are still under consideration.

An Unusually Fatal Accident.

Eben Van Hoosear, a wealthy farmer, with his wife, daughter and grandson, all of New Canaan, Conn., were struck and instantly killed by the New York and Newport express on the New York, New Haven & Hartford road at Five Mile River, Conn., Aug. 16. They were crossing the track in a carriage. There is no gate or watchman at the crossing, and it is said to be one of the most dangerous on the line.

Give Him a Pass.

An Ohio editor whose passes have been called in breaks out in a Jeremiade like this:

"Of all the grasping corporations that have from time to time enveloped the state of Ohio, none have ever evinced the monumental gall which has become the distinguishing characteristic of the Pullman Palace Car Co. No corporation in America gives so little service for such extortionate prices as does this gigantic monopoly. * * * The porter who does not receive his fee for making up a twenty-five cent bed which costs the traveler two dollars, develops all the impudence of a murderer at bay. He no longer waits for a voluntary contribution, he demands pay for the attention for which the traveler has already paid and the Pullman officers indorse his action, if they do not go further and demand from him a divide. * * * Every railroad in the country which has a contract with this octopus is compelled to pay it three cents for every mile its cars are hauled, and besides to keep them in repair. The Pullmans could thus make money, even though they never received a cent for their berths. These are facts to which we respectfully call the attention of Ohio's next Legislature. Special privileges are enjoyed by this corporation and special legislation is therefore invited to it.

Sending forth Laborers into the Harvest.

The supply of laborers in Northern Minnesota and Dakota is so scanty that the St. Paul, Minneapolis & Manitoba and the Northern Pacific have, on the appeal of the wheat raisers, whose crops are ready to harvest, reduced passenger rates to two cents per mile in the hope of inducing men to go there.

Railroads in Greece.

The railway between Corinth and Ægium, on the Corinthian Gulf, is now completed. MM. Tricoupis and Theotokis, the Minister of Marine, and others went by train on Sunday and inspected this portion of the line. It will be opened to the public shortly. The remaining section between Ægium and Patras will, it is stated, be finished in about three months, and then, if a line of steamers is established between Patras and Brindisi, London can be reached within four days from Athens.—*The Engineer.*

Buying Land in St. Louis.

A large tract of land in the northern portion of St. Louis near the river front has been bought by a mysterious party who is supposed to represent either the Chicago, Burlington & Quincy or the Merchants' Bridge & Terminal Company. It is said that the Chicago, Burlington & Quincy is to have the use of the Wabash terminals in St. Louis under a long contract.

TECHNICAL.

Locomotive Building.

The Buffalo, Rochester & Pittsburgh has ordered ten new locomotives of the Baldwin pattern.

The locomotive works of T. G. Nock, at Rome, N. Y., are now run to their full capacity day and night. They turn out now 13 finished locomotives per month. The New London & Northern has just put on two new mogul engines.

The Car Shops.

The Wagner Palace-car Co. continues to improve its plant at East Buffalo, N. Y. It has just contracted with Mr. W. R. Haven to build a 45x40 ft. addition to the boiler-room, also to build a smokestack 100 ft. high with a 6½x6½ ft. flue. Mr. Haven has the contract for the new car storage shed, which is to be to the south of the workshops and on a line with Broadway. This shed will be 500x40 ft. and will have tracks on which to store cars during the winter. Later two new car erecting shops will be built. These shops are to be like the one now occupied, and 500 ft. long. At present the full force of men is not at work, though they will all be on by Sept. 1. Those who are now working are engaged in building new buffet smoking cars for the New York and Chicago limited. The new private car for Mr. William K. Vanderbilt has just been started, as has been one for Dr. Webb, the president of the company. Manager Bissell is engaged in preparing designs for new cars for the Chicago & Northwestern.

The Lehigh Car Works, at Stemton, Pa., recently received a contract for 400 large gondola coal cars for the Central of New Jersey.

The Indianapolis Car Works are now working 700 men, the largest force in its history. It will soon commence work on a contract for 1,800 cars for the Atchison, Topeka & Santa Fe.

The Pullman Co. is building a new vestibule train, consisting of dining, combination and five sleeping car to be leased by Raymond & Whitcomb, the excursion agents, and to start Nov. 10 for the Raymond Hotel, Pasadena, Cal.

Bridge Notes.

It is proposed to erect a $40,000 bridge over White River at Hindostan, Ind. Address the Commissioners of Martin County.

Bids are requested till Aug. 28 for two iron bridges across Nation River, one 120 ft. span, 16 ft. roadway, with sidewalk; the other 130 ft. span, with 15 ft. roadway. Address Clerk of the Municipal Corporation, Winchester, York County, Ont.

The Vermont Construction Co., St. Albans, Vt., has the contract for an iron bridge 650 ft. long, with 4 spans, for the New London Northern. The company has also the contract for an iron bridge, 1,300 ft. long, on the extension of the Canada Atlantic.

The Buffalo, Rochester & Pittsburgh will build several bridges. G. E. Merchant, Rochester, N. Y., General Manager.

The county commissioners of New Milford and Bridgewater will build an iron bridge over the Housatonic River, Conn.

The Chicago, Burlington & Northern will build a bridge at Dubuque, Ia. Estimated cost, $250,000. W. H. Holcomb, La Crosse, Wis., General Superintendent.

Manufacturing and Business.

The contract for erecting buildings for the Burton Stock Car Co., Wichita, Kan., has been awarded to Russell Bros., superintendents for Patton & Fisher, of Chicago. The contract price of the work is $80,000.

The Lucy Furnace, at Pittsburgh, Carnegie, Phipps & Co., have ordered two feed-water heaters of 1,000 horse-power each from the Wainwright Manufacturing Co., of Boston.

Johnson, Holland & Co., of Chicago, are equipping with electric lighting apparatus a car for the Chicago, Burlington & Quincy.

Robert E. Libby has taken the Western agency for the American Brake Co., office 242 Clark street, Chicago.

A new company, known as the Davenport Foundry & Machine Works Co., will erect works at Davenport, Iowa.

The American Electric Manufacturing Co., of New York, received orders last week for dynamo machines and lamps as follows: National Machinery Co., of Denver, Col., 50 lights; Ashtabula Water-Works Co., Ashtabula, Ohio, 60 lights; A. R. Williams, Toronto, Canada, 25 lights; Jacob Reed's Sons, Philadelphia, 35 lights; Joliet Electric Light Co., Joliet, Ill., 200 lights; Bath Electric Light Co., Bath, Me., 35 lights; Shelbyville Water-Works Co., Shelbyville, Ill., 50 lights; Oswego Gas Co., Oswego, N. Y., 50 lights; Seattle Gas Co., Seattle, W. T., 50 lights; American Illuminating Co., Augusta, Ga., 100 lights; Badger Electric Light Co., Keokuk, Ia., 60 lights; Australian-American Electric Light and Power Co., Sydney, Australia, 800 lights.

Messrs. Otis Brothers & Co., of New York, have received an order to begin the construction of two hydraulic elevators for the new Eiffel tower, now in course of erection in Paris, which is to be 1,000 ft. high, and is to be completed in time for the World's Exposition in Paris in 1889. Special designs were submitted by Otis Brothers & Co., in conjunction with English, French and German elevator manufacturers. There will be six elevators, four running to a point 500 ft. above the ground and two running upward from that point.

The engine which will move all the machinery in machinery hall at the Atlanta, Ga., exposition is a Hamilton-Corliss engine, made by the Hooven, Owens & Reutchler company, of Hamilton, Ohio. It is of 75-horse power. The engine, boiler and shafting will be furnished by Messrs. Lederle & Cook, of Atlanta, who are agents of the Ohio firm.

James A. Roberts, assignee, gives notice that claims against Gardner & Co. must be presented to him at 237 Broadway, New York, before Oct. 5.

The Gold system of storage car heaters is now on all the passenger train cars of the Providence, Warren & Bristol. The road uses Gold's coupling with thermostatic trap, which was illustrated in the *Railroad Gazette* of June 17.

The Seashore Electric Railway, Asbury Park, N. J., expects to have its cars in operation by the last of this week. The cars are equipped with the Daft electric motor.

The Ingersoll Rock Drill Co. have sent to Larson, Keefe & Co., contractors for the Wickes tunnel, the following plant: Two 20 × 30 in. straight line compressors; two 40 in. × 17 ft. air receivers; sixteen 3½ in. Eclipse drills; ten tunnel columns of 7 to 16 ft., and by a recent order they send six tripods.

Iron and Steel.

J. B. Boyd and S. P. Calkins, of Quincy, Ill., will build a 50-ton charcoal furnace at Isbell, Ala., work to begin next spring.

The Beaver Falls, Pa., rolling mill will not start next Monday, as expected, but will remain closed down for an indefinite period.

The Clark Malleable Iron & Steel Co., Louisville, Ky., previously reported organized, will build iron and steel works.

The stockholders of the Mahoning Valley Iron Co., Youngstown, O., which has been incorporated with a capital of $1,000,000, changing it from a firm to a corporation, have elected the following directors: Richard Brown, H. O. Bonnell, W. Scott Bonnell, J. L. Botsford, C. D. Arms, of Youngstown; H. G. Cleveland, P. L. Hitchcock, Aaron Wilcox, Martyn Bonnell, W. N. Bowler, Frank Wilson, of Cleveland. The directors elected H. O. Bonnell President; Richard Brown, Vice-President; J. L. Botsford, Treasurer; W. Scott Bonnell, Secretary.

The contract for the rebuilding of the Maumee Rolling Mills, Toledo, O., has been let to Pittsburgh parties. The mills were burned three months ago, and were estimated to be worth $400,000. Very little of the machinery was damaged. The new mill will be entirely of iron and will be 200 ft. in length by 80 ft. in width. The Northwestern Natural Gas Co. will supply the gas.

The Alamakee Iron Mining Co. of Rockford, Ill., capital stock $2,500,000, has been incorporated to work, operate, and develop mineral lands and options on same; incorporators, Henry W. Price, George S. Roper and John B. Sine.

The Waukon Iron Mining Co. of Rockford, Ill., capital stock $1,500,000, has been incorporated for the working, operating and developing mineral lands and options on same; incorporators, Henry W. Price, George S. Roper and John B. Sine.

The Rail Market.

Steel Rails.—Among the sales is one lot of 8,000 tons by a Pennsylvania mill to the Virginia Construction Co., at $42.25 delivered at an interior Southern point, 1,000 tons in October, and 3,500 tons each in November and December. A sale of 3,000 to 5,000 tons is said to have been made to the Baltimore & Ohio. All mills are practically filled up to the end of October, and it is difficult to place orders for the next two months, the price being $38@$38.50. The agreement drawn up at the Long Branch meeting on the 2d inst. has been signed by the North Chicago, Cambria, Pennsylvania, Union, Lackawanna, Joliet, Western, Cleveland, Edgar Thomson and Homestead, Bethlehem, Scranton, Troy, Worcester and Springfield works, to all of whom, except the last, percentages have been granted out of the provisional allotment of 800,000 tons.

Old Rails.—Very little business reported. Tees have been offered, in one case of a 1,000 ton lot, at $24.

Union Switch & Signal Co.

This company reports the following work in progress: The block signaling on the New York, Lake Erie & Western from Jersey City to Turners is completed. A similar system is being put in on the New York, New Haven & Hartford from New York to New Haven; towers are built a mile and a half apart, and there are interlocking systems at New Rochelle junction, New Rochelle yard and other points. On the Boston & Albany the signaling of the Springfield yard is completed, and work is begun on the yard at Worcester.

On the Old Colony the interlocking at Braintree Junction had just been finished when the tower was entirely destroyed by fire, and a complete new machine is now going in there. They have an order also to signal Mansfield yard on this road. Signals are being put in at Mystic River drawbridge, on the New York, Providence & Boston.

On the Pennsylvania the remodeling of the interlocking system at Shanley's cut was to have been finished on the 15th inst., and that at Mantua is just finished. The signaling at Frankford Junction is to be completed by Sept. 1. On the Pittsburgh, Fort Wayne & Chicago interlocking towers have just been opened at Van Buren, Harrison and Polk streets, Chicago, and others are to be put in at once.

On the Michigan Central interlocking apparatus is erecting at Nichols, Mich., and at South Lansing. A number of small places are to be signaled on the Chicago, Burlington & Quincy. An interlocking tower has just been opened at Los Angeles, Cal., and another is nearly ready for shipment to San Bernardino, Cal. Interlocking schemes are now being put in at Binghamton, Owego and Painted Post, on the line of the New York, Lake Erie & Western.

Long Life of Ties.

The railroad ties laid down near Reno, Nev., nineteen years ago, have been taken up and found to be in a perfect state of preservation. An analysis to determine what protected the wood from rotting will be made at once.—*Exchange.*

The Sharpneck Anti-Friction Journal Box.

The following letter concerning this new device has been handed to us:

Chicago, Rock Island & Pacific Railway,
Gen'l Master Car-Builder's Office,
CHICAGO, Aug. 8, 1887.

GEO. P. SMITH, Esq., *Secretary Sharpneck Anti-Friction Journal Box Co.*

DEAR SIR: The following is a statement of the performance of the journal boxes on C., R. I. & P. coach No. 16 to this date: Two trial trips were made with it after it was applied —one to Washington Heights and return to Fifty-first street, 14½ miles, and one to Blue Island and return to Fifty-first street, 22 miles, with perfect success. It was then run as a special to Joliet and back, 80 miles, then put in regular Blue Island train and ran three days, making 100 miles per day; then two more trips as special to Joliet, and was run as fast as the engine could turn its wheels, making 160 miles more; then put on Peru accommodation train and made 10 trips, 200 miles each; then was put on main line passenger train Nos. 1 and 2, between Chicago and Council Bluffs, and is at this writing on its third trip of 1,000 miles each, made without the least trouble and without a particle of lubrication. After it arrived back from its first trip to Council Bluffs I had the car brought to this shop for examination, and, as far as I could see, and my foreman also, it was just as good as

when first applied. Even the tool marks could yet be seen in the rollers. The fact is that it has been a success, as far as running is concerned, from the first, and if it proves durable, as from all appearances now it will be, it certainly is a wonderful invention. The difference in the running of the car is still more wonderful. One man can push it along easily on a level track, where it takes 8 or 10 men to push one of our other coaches on same track.

B. K. VERBRYCK, *Gen'l M. C. B.*

Mr. Verbryck was seen by a representative of the *Railroad Gazette* and corroborated all that his letter states. Other officials of the Rock Island speak highly of the device. General Superintendent Chase, of the Atchison, Topeka & Santa Fe, who was a member of a trial party on a trip to Joliet, has ordered the General Manager's car of the Santa Fe fitted up with the boxes, and Mr. Sharpneck, the inventor, is now in Denver superintending that work. Mr. Chase said that in addition to the saving on lubrication the box would be found most useful on the fast stock trains, where hot boxes give so much annoyance with the old style boxes; besides this an engine could pull a larger number of cars.

The Sharpneck anti-friction journal box, which seems to have proved to some men that it is worth at least respectful consideration and trial, is a device for running the journals in rollers, and securing rolling friction only. Six rollers, each 10 in. long and 3¼ in. diameter, surround the journal. These rollers are kept spaced by their own axles, which pass through rings at either end. These rings go around the journal. Within each large roller are six small rollers, around which it turns, to relieve the friction between the roller and its axle.

The Martin Car Heater.

The Martin Anti-fire Car Heater Co., of 140 Nassau street, New York, has closed a contract with the New York Central for the equipment of its cars with the Martin system. The contract covers the main line and all leased lines. Work is to be begun at once.

Logging Locomotive.

The State Run railroad of Pennsylvania employs an engine which is a 25-ton Shay's patent, built at Lima, O., and is capable of hauling 10 logging cars, or 30 tons, up the grade of 396 ft. to the mile, on 10° and 12° curves.

The Daft Electric Motor for the Ninth Avenue Elevated.

The Daft locomotive "Ben Franklin" will shortly make its appearance upon the Ninth Avenue Elevated road. The experiments in electrical propulsion by the Daft Electric Light Co. upon this line have covered quite a period of time. The first was made in the autumn of 1885, and, although satisfactory within its limit, was not sufficient for the end in view. The motor was of 75 horse-power, and, while fairly equal to the maximum work, had not that surplus of power necessary to secure the rapid acceleration at starting which the frequent stoppages make indispensable for a service of this nature. Experiment showed that this effort ranged as high as 120 horse-power with the steam locomotives. The only remedy was to increase the power of the motor to its present capacity—125 horse-power—which was done forthwith.

When just ready for trial, the railway authorities found the conductor then in use—a central "third rail"—an inconvenience to their steam locomotives, and requested the substitution of something else. A copper rod ⅝ in. in diameter, outside of and parallel with the track, was decided upon, and the preparation of over four miles of this, with the necessary insulators, expansion joints, switches, etc., and the subsequent connecting, without interrupting for a moment the routine service, has consumed the entire time, up to the present, which could be spared from the execution of orders for street railways whose completion was subject to stipulated dates. The day of the experiment cannot be definitely given, but it is safe to say it will take place before the close of the coming autumn.—*Electrical World*

The Field Motor on the Elevated.

It is stated that Mr. S. D. Field's motor will be tried this week on the 34th street spur of the elevated. For this motor the circuit is made through a central rail and the track rails.

Manchester Ship Canal.

It is announced that the Board of Trade have issued a certificate to the Manchester Ship Canal Company that shares for the whole of £5,000,000 have been issued bona fide as required by their act before any works can be executed, and, further, that the two-thirds of the authorized share capital required to be subscribed before interest can accrue have been issued.

The New Navy.

The Secretary of the Navy awarded, Aug. 15, the contracts for constructing the five new naval vessels for which bids were opened recently. Cruiser No. 1, the Newark, is awarded to Cramp & Sons for $1,248,000, according to the department's plans for the hull and the contractors' plans for machinery; cruiser No. 4 to Cramp & Sons (contractor's plans) for $1,350,000; cruiser No. 5 to the Union Iron Works of San Francisco (department's plans for hull and machinery), for $1,428,000; and gunboats Nos. 3 and 4 to N. F. Palmer, Jr., & Co., of New York (Roach's assignees), at $490,000 each.

A Pneumatic Hammer.

The English correspondent of the *Age of Steel* thus describes a power hammer in the Manchester exhibition: It is a 3 cwt. pneumatic power hammer for rapid forging purposes, and for use in places where it is inconvenient to obtain the requisite steam for working an ordinary steam hammer. Its salient features are that the hammer is driven by a strap which drives a pulley on the same shaft as a disk, containing a pin which drives the head of the hammer by means of a connecting rod. The makers thus further describe it: The belt pulley through which the hammer is driven runs loose upon the shaft, the spindle being brought into gear by a cone clutch, moved by a lever, which lever also applies a brake to the circumference of the crank disk, when it is required to stop the hammer quickly. The falling head of the hammer is hollow. The hammer is closed at the bottom and has a stuffing box at the top to prevent the escape of the air contained within it, on either side of the piston, which is attached to the end of what would in an ordinary hammer be the piston rod. Hence the head of the hammer is the cylinder, and the piston rod works within it being actuated by the crank and connecting rod, the motion being transmitted to the hammer through an air cushion on each side of the piston. The imprisoned air gives the requisite elasticity to the blows and compensates for the various thicknesses of the material which is being operated upon. The air is renewed at every stroke by means of small holes just above and below the piston, when in the middle of the cylinder, so that in this position both ends of the cylinder are open to the atmosphere.

The International Railway Congress.

The International Railway Congress Commission of Brussels announces that the congress will meet at Milan on Sept. 17 next, and that the sittings will continue until Sept. 25 in clusive. In addition to Italy and Belgium, France, Russia, the Netherlands, Austria, Denmark, Sweden and Norway, Portugal, Turkey, Roumania, Bulgaria, Servia, Egypt and Brazil will all be represented at the Congress by official delegates or functionaries of state railways. The companies ta ing part in the congress represent together, in round figures, 120,000 kilometers of railway lines and 140 separate administrative departments. The members, some 300 in number, attending the Milan congress, will be officially received as the guests of the Italian Government, by whom instructions have already been given to the Milan authorities that will insure a cordial welcome to the attending delegates. The last international congress—which was at the same time the first—was convened in Brussels by the Belgian Government in 1885, at the time of the celebration of the jubilee of Belgian railways.

The Van Beek Reclining Car Seat.

This seat is coming into use because of its points of practical value. It is economical of space and in cost. It can be used in standard coaches without encroaching on the aisle. The foot and leg rests give all the positions of any reclining chair. By leaving off the foot rest and using the round, as with the ordinary car seat, a seat is provided that can be used in any coach without decreasing the seating capacity, and which gives three changes of position with a head rest. The seat is made by the Streator Reclining Car Seat Co.

Tracks to be Sunk in New York City.

It is said that President Borden, of the New York city Park Commissioners and the officers of the New York Central have agreed upon a plan for sinking the railroad tracks of the Harlem Division from the Harlem River to the city line, some 8 miles. This is to carry out the intention of the bill passed at the last session of the New York Legislature and opposed by the Governor. The changes of grade will amount in some cases to 8 feet. It is said that work will not probably be begun till next spring.

Oil Fuel.

The Tingue Manufacturing Company, of Seymour, Conn., is having pipe laid from the Naugatuck Railroad to its mill to convey oil for use as fuel. Large storage tanks will be sunk in the ground near the boilers, and the oil pumped direct from the cars through the pipes into the tanks.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Western Society of Engineers* holds its regular meetings at its hall, No. 15 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *National Association of General Passenger Agents*, at St. Paul, Minn., Sept. 20.

The *Master Car and Locomotive Painters' Association* New York, Sept. 14.

General Time Convention, Hotel Brunswick, New York City, Oct. 12.

Contracting Freight Agents.

Forty members of the Association of Contracting Freight Agents met in annual session in Detroit on Aug. 11, and W. W. Whitacre, of the Lake Shore & Michigan Southern at Cleveland, was elected President; Fred Rogers, Assistant General Freight Agent of the Chicago, Burlington & Quincy, Vice-President; J. H. Veitch, General Traveling Agent of the Chicago, Milwaukee & St. Paul, Secretary; and E. A. Treadway, of the Michigan Central Railroad at Detroit, Treasurer.

Brotherhood of Locomotive Engineers.

The Brotherhood of Locomotive Engineers met in Atlanta, Ga., on Aug. 13, with three hundred members present. The delegates were welcomed by Governor Gordon and Mayor Cooper. Mr. Arthur, Chief of the Brotherhood, made an address. The Rev. J. W. Lee, the pastor of Trinity Church, made the regular address.

Engineers' Club of Kansas City.

Instead of the regular meeting of Aug. 1, the club took an excursion July 30 to Sibley, Mo., to see the work on the bridge of the Chicago, Santa Fe & California Railroad over the Missouri, by invitation of Mr. Octave Chanute. Members and guests to the number of 52 took part in the excursion. Ample opportunity was given to the members to see the progress of the work, and several of them took occasion to go down to the caissons. Lunch was served on the train.

PERSONAL.

—J. W. Morse, General Passenger Agent of the Union Pacific, has resigned.

—Andrew R. Trew, Resident Engineer of the New York Central road at Tonawanda, N. Y., was found dead in bed at his home there on the morning of Aug. 11. He was 62 years of age, and well known among railroad men. He had charge of the construction of the cantilever bridge at Niagara Falls.

ELECTIONS AND APPOINTMENTS.

Atchison Belt.—The directors of this Kansas company are: John M. Price, E. K. Blair, S. C. King, J. W. Parker, F. O. Mills, S. B. Glazier, L. Kiper, George Storch, S. P. Pomeroy and W. W. Guthrie, all of Atchison.

Atlantic & Pacific.—Amos M. Beal has been appointed Superintendent of the California division, vice C. T. McLellan, resigned.

Baltimore & Sparrow Point.—The incorporators of this Maryland company are: Geo. Small and Jacob H. Taylor, of Baltimore, and L. S. Bent and F. W. Wood, of Steelton, Pa.

Birmingham & Northwestern.—The officers of this new Alabama company are: President, T. M. R. Talcott, of Mobile; Secretary and Treasurer, H. Tacon, of Mobile; Counsel, T. Inge, of Corinth, Miss.; W. B. Duncan, H. B. Plant, A. H. Stevens, of New York; Wm. Nichols, of St. Louis; Wm. Berney, of Birmingham; B. J. Hyneman, Wm. Inge, of Corinth; T. C. Leake, of Richmond; E. L. Russell, F. E. Rockwell, T. M. R. Talcott, of Mobile.

Camden & Northwestern.—The directors of this new Arkansas company are: C. D. Gee, Richmond Hibbard, D. Newman, H. O. Spurgeon and W. F. Tate.

Desha & Eureka Springs.—The company has elected the following directors: Geo. P. Bangs, E. E. Pratt, William E. Stowe and H. M. Cross, all of Boston, Mass., and Jas. Murphy, J. M. Whitehill, W. B. Dutton, H. M. Waldron and J. M. Barnard, of Desha County, Ark. The board of directors have elected officers as follows: Geo. P. Bangs, President; L. W. Whitehill, Vice-President; H. W. Waldron, Secretary; Jas. Murphy, Treasurer; E. E. Pratt, Assistant Treasurer; W. B. Dutton, General Manager, and Jas. Murphy, Attorney.

Eastern Railroad Association.—The officers of this association are: President, W. D. Bishop; Vice-President, Theodore N. Ely; Treasurer, A. A. Folsom; Counsel, A. McCallum; Secretary, J. J. Harrower. Its office is at 614 F. street, Washington, D. C.

East St. Louis Terminal.—The incorporators of this company are: Samuel Hays, J. R. Laughlin, F. W. Smith, W. C. Morris and Joseph H. Zambalen.

Fitchburg.—George J. Fisher has been appointed Purchasing Agent, vice F. S. Pratt.

Florida Southern.—S. C. Boylston has been appointed General Freight and Passenger Agent.

Forest City & Watertown.—The following are the officers of this Dakota company: R. M. Springer, President; A. W. Smart, First Vice-President; J. M. Strout, Second Vice-President; B. J. Gleason, General Manager; J. F. Whitlock, Secretary; T. B. Rutherford, Treasurer; F. G. Brooks, Chief Engineer; S. F. Bullard and C. M. Brooks, Assistant Engineers. Headquarters, Forest City, Dak.

Indianapolis & Vincennes.—It is reported that Charles Neilson has been appointed General Manager.

Kansas City, Independence & Park.—M. B. Mason has been appointed General Superintendent and Master Mechanic; office at Kansas City, Mo.

Kansas City & Sabine Pass.—Col. Harrison M. James, of New York, is President, and Frederick M. Day, of Brooklyn, Treasurer of this new Missouri company.

Lake Geneva & State Line.—The incorporators of this new Wisconsin company are: Marvin Hughitt, Albert Keep, C. E. Simmons, J. M. Whitman and J. B. Redfield.

Leavenworth & Denver Short Line.—The directors of this new Kansas company are: James N. Burnes, of St. Joseph; H. Russ, Ed. Carroll, John Wilson, A. B. Taylor, John Kelley, J. W. Frogler, W. D. Kelley, Joseph Whittaker, M. A. Garrigus, C. L. Knapp, D. J. Keller, Vinton Stillings and H. M. Allen, of Leavenworth; A. M. D. McCook, of Fort Leavenworth; Mathew Edmunds, of Oskalcosa; N. A. Adams, of Manhattan; A. P. Riddle, of Minneapolis; C. W. Smith, of Rook County; H. J. Harris, of Graham County; E. S. Turner, of Sheridan County; R. S. Newell, of Thomas County, and W. S. Tait, of Sherman County.

Louisville, New Albany & Chicago.—J. J. Coleman has been appointed Northwestern Freight Agent, with office at Milwaukee, Wis.

Newport & New York Rapid Transit.—The incorporators have elected a board of directors, to serve until the first meeting of the stockholders, as follows: Jesse Boynton and Edmund W. Dayton, of Providence; Daniel Watson and Joseph Cotton, of Newport, and H. Audley Clarke, of Canonicut. The board organized with Jesse Boynton as President and H. Audley Clarke Secretary and Treasurer. William P. Sheffield, Jr., of Newport, has been admitted as associate corporator. The company has voted to locate its office in Newport.

New York City & Northern.—The following have been elected directors of this road, which was sold under foreclosure on Aug. 17: Abraham B. Baylis, Edward H. Bonner, Henry F. Dimock, Joel B. Erhardt, George J. Forrest, William H. Hollister, Alfred Lichtenstein, John J. McCook, Arnold Marcus, William Mertens, Rufus Randall, George Warren Smith and George F. Stone. Six directors were selected by the bondholders' committee, six by the New York Loan & Improvement Co., and the thirteenth was chosen by the twelve.

Occidental Construction Co.—The incorporators of this Kansas company are: George B. Sidell, Thos. N. Brown, J. O. Simmons, S. G. Hoor and Chas. O. Ingersoll, of New York; H. F. Searle, of Brooklyn; D. P. Jones, of Fort Scott; B. W. Decourcy, of Independence, Kan., and J. M. Johnson, of Garnett.

Omaha, Ness City & Mexico.—R. P. Conkling, of New York, and S. Josey Pecos, of the City of Mexico, are among the directors of this new Kansas company.

Omaha & Yankton.—The directors of this road are: Harvey N. Shepard, of Boston; T. Fales Gray, of Boston; Gilbert H. Shepard, of Jacksonville, Fla.; S. D. Mercer, of Omaha; John A. Creighton, of Omaha; Nathan Shelton, of Omaha; James F. Dillon, of Omaha.

Portsmouth & Dover.—The stockholders of this New Hampshire road have chosen the following directors: Frank Jones, Daniel Marcy, Joseph A. Walker, George E. Hodgdon, Charles H. Sawyer, Frank A. Christi and George F. Lowell.

Red River Construction Co.—The incorporators of this new Illinois company are: W. L. Whittaker, John C. Orrick and F. E. Hinckley.

Rochester City & Brighton Terminal.—The incorporators of this New York company are: C. C. Woodworth, J. M. Whitney, W. C. Barry, W. D. Ellwanger and Chas. P. Barry.

St. Joseph & Santa Fe.—The directors of this new Missouri company are: W. A. McDonald, Isaac Hosea, G. J. Emlehart and George Lamar, all of St. Joseph; Daniel Crosby, B. M. Curtis, D. A. Harvey, H. R. Rowley and W. C. Campbell, of Topeka.

St. Paul, Alexandria, Jennings, Lake Arthur & Gulf.—The incorporators of this Louisiana company are: E. Deshe, V. Lodoux, D. Hebert, D. Sweet, L. J. Cutting and McFarlane.

Terre Haute & Indianapolis.—W. R. McKeen has been chosen President in place of H. S. Ives, resigned. It will be remembered that Mr. McKeen retired from the office in June last, to make room for Mr. Ives when the latter bought a controlling interest in the road.

Texas & Pacific.—G. McD. Nathan has become Traveling Freight and Passenger Agent, vice N. M. Carter, resigned, with office at Atlanta, Ga.

Union Pacific.—Thomas L. Kimball has been appointed Assistant to the First Vice-President, his former office, that of General Traffic Manager, having been abolished.

Wabash Railway.—E. R. Newman has been appointed Commercial Agent at Chicago.

Wisconsin Central.—M. J. Higgins has been appointed Superintendent of the Penokee Division.

OLD AND NEW ROADS.

Americus, Preston & Lumpkin.—Track on the eastern division of this road is now laid to Abbeville, 62 miles from Americus, Ga.

Arkansas Midland.—It is said that this company is to buy a section of the St. Louis, Iron Mountain & Southern track from a point 8 miles east of Helena, Ark., to Marianna.

Atchison Belt.—The company has filled its charter in Kansas. Capital stock, $950,000.

Atchison, Topeka & Santa Fe.—The following figures show the condition of tracklaying on the various extensions of this road under construction July 31: Augusta, 20.5 miles; Great Bend, 130.9; Hutchinson, 84.3; Little River, 30.3; Independence, 55.8; Chanute, 44.5; Mulvane, 84.9; Colony, 24.6; Osage City, 20.4; Elliner, 9.7; Douglass, 18.7; Arkansas City, 154.1; Larned, 24.5; Benedict, 23.7-Howard, 8.2; Girard, 11.1; Kiowa, 136; Burlington, 10.9; Strong City, 80.3; Leavenworth (Northern and Southern), 45.6; Denver & Santa Fe, 44.9; Chicago, Santa Fe & California, 16; Chicago, Santa Fe & California, of Iowa, 18.1. Total, 1,108.1.

Baltimore & Ohio.—This road is bringing considerable live stock to Philadelphia from West Virginia and Southern Ohio. On one day recently it brought 85 cars.

Baltimore & Sparrow Point.—Incorporated in Maryland to build from Baltimore to Sparrow Point.

Birmingham & Northwestern.—Organized at Birmingham, Ala., to construct a road from that city to Corinth, Miss. The line is already surveyed.

Boston & Providence.—The new Bussey Bridge on this road will cost $70,000, according to specifications.

California Central.—The new branch of this road from San Diego to Cajon Valley, Cal., has been contracted for a distance of 14 miles from the place. The road will pass through Marilou Park and cross the Eucalyptus summit into the Cajon.

California & Oregon.—Work is rapidly progressing all along the line. The Summit tunnel lacks only 400 ft. of being pierced through, and the track on the southern side is laid up to the tunnel.

California & Nevada.—Negotiations are said to be pending for the sale of this narrow gauge line, which now runs from Oakland to San Pablo, Cal., to a syndicate of San Francisco capitalists. If purchased, it is intended to push the road through the Walnut Creek country, the San Joaquin Valley, and thence to Sonora.

Camak & Wadesboro.—This company has obtained a charter in Georgia to build a road from Camak to Wadesboro, S. C.

Camden & Northwestern.—Articles of incorporation have been filed in Arkansas. The new road is to run from Camden, Ark., to a point on the St. Louis, Iron Mountain & Southern.

Canadian Pacific.—On Aug. 15 the company opened its new line between Toronto and Montreal, and at the same time the extension to St. Johns and Farnham, P. Q., by way of its new steel cantilever bridge over the St. Lawrence River. At Farnham, P. Q., the line joins the Southeastern and the through trains of the Montreal & Boston Air Line and of the Montreal & Portland line will be run over this route, using the Montreal station of the Canadian Pacific. The mileage of the "short line" between Toronto and Montreal is about 40 miles less than via Ottawa.

The company has transferred its junction with the St. Paul, Minneapolis & Manitoba road from Emerson to Gretna.

The company has sent a gang of 50 men to Morris, Man., where they have begun work on a spur line crossing the route of the new Red River Valley road, and which will obstruct the building of the latter. An open conflict is expected.

Central Iowa.—The Elijah Smith committee of bondholders has about $1,200,000 first mortgage bonds with which to antagonize the New York committee of reorganization, and will attend the sale of the road on Sept. 7, with the intention of buying the main line.

Chattanooga, Rome & Columbus.—A contract for the construction of this road has been awarded. The new line will extend south from Chattanooga, Tenn., through Rome, Cedartown and Carrollton, Ga., 230 miles, and it is to be completed within 11 months.

Work was begun at Chattanooga, Tenn., on Aug. 17. Ground was broken in the presence of thousands of spectators, with impressive ceremonies. The road is to be 246 miles long.

Chautauqua Lake.—It is said that the construction of a line to Westfield, N. Y., for which surveys were made and some money raised, will be abandoned, as agreeable arrangements have been made with the Lake Shore & Michigan Southern concerning traffic to that point.

Chicago & Northwestern.—The company has commenced tracklaying on its Wyoming Central line westward from Douglass, up the North Platte to Fort Caspar, a distance of 60 miles.

The company will build next year its branch from Felch Mountain to Republic, Mich., which was surveyed last winter.

Surveyors are reported to be at work between Zumbrota, Minn., and St. Paul, with a view of extending the Zumbrota branch to the latter city.

Chicago, St. Louis & Paducah.—The builders of this road have agreed to deliver to the St. Louis, Alton & Terre Haute the entire capital stock of the new company except such amount as may be necessary to fill local subscription, and 50 per cent., or $500,000, in second-mortgage income bonds of the new company. The St. Louis, Alton & Terre Haute will lease the Chicago, St. Louis & Paducah for 980 years at a rental of 30 per cent. of the gross earnings of the latter company, with the guarantee of a minimum rental sufficient to secure the payment of interest, on the first-mortgage bonds.

Cincinnati, Hamilton & Dayton.—Henry S. Ives, of New York, who bought a large portion of the stock of this road several months ago, and thereupon assumed the management of the property, has made an assignment. His affairs are badly mixed, and various conflicting rumors are afloat concerning unauthorized uses alleged to have been made of the securities of the road. The amount of Ives' liabilities is stated as twenty millions, and the assets a million more. A meeting of stockholders of the road at Cincinnati Aug. 16 was adjourned to Aug. 30, to admit of further investigation of unsettled matters connected with the pending lease of the Dayton, Fort Wayne & Chicago.

Dayton & Tellico.—Incorporated at Athens, Tenn., by J. B. McElwee, J. M. Burkett and others.

Denison, Bonham & New Orleans.—Work is progressing rapidly on this road. The line between Denison and Bonham, Tex., is nearly ready for the ties, except the first two miles out of Denison, which is very heavy and will be finished as soon as possible. The present indications are that the road will not stop at Bonham, but be pushed to Cooper.

Denver & Rio Grande.—The location of this road from Durango to Rico, Col., has been completed. It is understood that the present line shortens the old line by about 10 miles, the length now being about 82 miles.

Detroit & St. Clair River.—The company is at work securing right of way along the St. Clair Lake and river in Michigan, and there is a prospect that the road will be extended to Port Huron.

Duluth Terminal.—This company is being organized in Duluth, Minn., to build terminal and transfer yards and lines about the city and to furnish new railroad companies with entrances into the city. The main object is to induce new roads to build to Duluth.

Du Pont, Macon & Florida.—Organized in Georgia to build a road from Conyers, Ga., to some point on the East Tennessee, Virginia & Georgia road.

East St. Louis Terminal.—Articles of incorporation filed at East St. Louis, Ill. The company expects to build a road from the town of Venice to East Carondelet, with branches connecting it with roads at East St. Louis and East Carondelet. Capital stock, $5,000,000.

Fitchburg.—At a meeting in Boston, Aug. 11, the stockholders voted to issue $3,000,000 bonds, to provide means for funding floating debt incurred on account of consolidation with the Troy & Boston, and for the payment of money borrowed. The consolidation agreement with the Troy & Boston requires the issue of $3,000,000 of bonds to pay for that property. At the meeting of stockholders held April 30, 1887, to ratify that consolidation there should have been a vote passed authorizing the issue of bonds, and for that purpose this meeting was called. Harris B. Stearns, of Boston, was appointed to approve the bonds, and to certify that they are properly issued and recorded.

Fort Worth & Denver City.—Track is laid to a point 318 miles from Fort Worth, Tex.

Georgia Company.—A syndicate of holders of securities of the Central Railroad of Georgia has formed an organization under the above title to control the road. The members deposit 40,000 shares of Central stock and $400,000 in cash as a basis of capitalization for the new corporation. The Georgia Company thereupon issues $4,000,000 of 5 per cent. trust bonds, corresponding in face value with the amount of Central stock deposited by the syndicate, and also $12,000,000 stock, or three shares for one of Central. This stock and these trust bonds go to the syndicate, in lieu of Central stock surrendered. The trust bonds are said to have been all taken by a syndicate of foreign capitalists at 95 cents. The following are the names of those interested: Messrs. John H. Inman, Emanuel Lehman, Alfred Sully, John C. Calhoun, H. B. Hollins, August Belmont, Jr., A. L. Rice and Kissell & Co., of New York; Dennison, of Philadelphia, and Patrick Calhoun, C. H. Phinizy, A. L. Partridge and E. P. Alexander, of Georgia. Messrs. Inman, Belmont, Sully, Lehman, Hollins, Rice and Dennison have been chosen as the voting committee of the Central stock, and the official term of said committee is five years.

Grand Southern.—On the application of bondholders the Court has placed the control of this road in the hands of a Receiver. The road runs from St. John to St. Stephen, N. B., a distance of 82 miles.

Great Lake Steamship Co.—This company was recently organized in Milwaukee by members of the recently organized Lake Superior Consolidated Iron Co., with the object of building and operating vessels for the transportation of the products of their mines. Capital stock, $4,000,000.

Gulf, Colorado & Santa Fe.—About 12 miles of track have been laid on the Cleburne and Weatherford extension of this road, and the line will be completed to Weatherford next September.

Hartford & Connecticut Western.—The stockholders have decided to accept the resolution passed at the last session of the Legislature authorizing the construction of a branch to Springfield, Mass., and the issuing of bonds not exceeding $25,000 a mile.

Illinois Central.—The company has applied for additional wharf privileges in New Orleans, La.

Indianapolis & Wabash Railway.—Under this name the re-organized Indianapolis, Decatur & Springfield has filed articles of incorporation in Indiana. At the foreclosure sale of the road, May 25, it was purchased by John D. Probst, H. B. Hammond, T. B. Atkins and Simon Sterne, a committee representing the bondholders who are secured by the second mortgage on the property. These gentlemen, with Charles C. Allen, Charles N. Vilas and Stephen H. Taylor, constitute the new board of directors. The capital stock of the road is fixed at $4,240,000, and the Indiana line is defined as running from Indianapolis to a point on the Illinois line, in Vermillion County, where it connects with the Indianapolis, Quincy & Missouri River road.

Jacksonville, Tampa & Key West.—It is rumored that this company has secured control of the DeBary line of steamers between Jacksonville and Sanford. These boats have been taking a large share of the freight between these points.

Kansas City, Memphis & Birmingham.—The earthwork on the Aberdeen, Miss., branch of this road, a distance of 10 miles, is rapidly approaching completion, and the company is now building an iron draw-bridge across the Tombigbee River near Aberdeen.

Kansas City & Sabine Pass.—Articles of incorporation filed in Missouri. The object is to build an air line from Kansas City, Mo., to Sabine Pass, Tex., a distance of 700 miles, that place being the nearest coast point to Kansas City by 400 miles. It is said that right of way has been obtained for the greater part of the way, and terminal facilities secured in Kansas City. Capital of company, $2,500,000.

Kansas City, St. Joseph & Council Bluffs.—The company will soon begin to build a second track road between St. Joseph and Kansas City, Mo., to provide for increased business.

Kansas City, Watkins & Gulf.—Incorporated in Louisiana to build from a point on the Louisiana Western road in the parish of Calcasieu, north to the state line and south through the parish of Cameron. Headquarters at Lake Charles, La.

Kinderhook, Valatie & Stuyvesant.—This company has been incorporated in New York to build from Kinderhook Lake to Stuyvesant Landing on the Hudson River, 10 miles.

Knoxville Southern.—The election last week in Knoxville, Tenn., resulted almost unanimously in favor of the city subscribing $275,000 to the stock of this company. This is the Tennessee division of the Marietta & North Georgia. Work will begin at once, and the road is to be finished in 18 months.

Lake Geneva & State Line.—A company by this name has filed articles of association in Wisconsin to build a line from Geneva along the north shore of Geneva Lake through Fontana southerly to the state line, 13 miles. Capital stock, $50,000. The incorporators are Chicago & Northwestern men.

Leavenworth & Denver Short Line.—The company has organized in Kansas to build a standard gauge road from the Missouri River through the counties of Leavenworth, Jefferson, Jackson, Portawatomie, Riley, Clay, Ottawa, Lincoln, Mitchell, Osborne, Rooks, Graham, Sheridan, Thomas, Sherman and Cheyenne to the west line of Kansas. Estimated length of road, 430 miles; capital stock, $15,000,000.

Lookout Mountain, Lulu Lake & Gadsden.—Incorporated in Chattanooga, Tenn., by W. P. McClatchey and others to build a road from a point on the Tennessee and Georgia state line to Gadsden, Ala.

Louisville, New Orleans & Texas.—The company has ordered 500 box cars and 100 fruit cars, to be delivered by September.

Lynchburg & Durham.—The company has advertised for bids for the construction of the first 10 miles of this road leading out from Lynchburg, Va. Bids will be opened Aug. 25. P. J. Otey, of Lynchburg is President.

Maryland & Little Tennessee.—The company has been incorporated in Tennessee.

Mexican Central.—The locomotive engineers on this road struck this week. The demand the reinstatement of an engineer named Harry Keller, who was recently discharged. The company refused, on the ground that Keller is an agitator and caused trouble on the road. It is estimated that 2,000 have been forced to quit work on account of the strike. There is no trouble anticipated. The traffic is generally suspended, though the officers of the company are running some passenger trains.

Mexican National.—Hampton & Thornton have obtained the contract for building this road from San Luis Potosi to Saltillo, Mex. The work begins immediately, and is to be completed within one year.

The contract for 114 miles of the Southern division of the main line of this road will be let at the City of Mexico, Aug. 22.

Michigan Central.—This company is contemplating the purchase of land in Buffalo along the water front for terminal warehouses and yards. It is at present wholly dependent upon the New York Central.

Minnesota & Northwestern.—The Chicago *Tribune* says that the Chicago, Rock Island & Pacific and the Illinois Central are trying to get control of this road.

Missouri Pacific.—The company has issued a circular announcing its control and future operation of the Denver, Memphis & Atlantic, now completed from Chetopa to Larned, Kan., 292 miles. It is reported that all Missouri Pacific roads in Kansas will stop construction except that now being built by the Fitzgerald & Mallory Construction Co. from Geneseo on the north line of Rice County. This road runs from Salina to McCracken, where it connects with the Denver, Memphis & Atlantic. The line is completed to a town 6 miles from the west line of the state of Kansas, and work is progressing eastward on the Pueblo end.

Montreal & Lake Maskinonge.—Work was begun on Aug. 11 on the road from St. Gabriel de Brandon to Maskinonge, Quebec.

Nashville & Tuscaloosa.—The road is now in operation 20 miles southwest from Centreville, Tenn., to Aetna, and engineers have located an additional 20 miles, reaching into Wayne County.

New Brunswick.—Seven ballast trains are at work north of McAdam Junction and a large extra force is employed on bridges, culverts, station yards and buildings at various points. The company has just added 100 flat cars, 60 stock cars, 40 ballast cars, 4 snow plows and 1 steam shovel to its equipment.

New Roads.—Workmen are employed in constructing the road-bed for the new steam railroad to connect the Jackson street cable road with the Cliff House, San Francisco, Cal. A tunnel is to be pushed 300 ft. into the cliff, just north of the City Cemetery, in which 100 kegs of powder will be exploded in an effort to blast the obstructing rock into the sea. The cost of grading one mile of the road near the cemetery has been estimated at $100,000. The road, for a long distance, follows the shore line about 150 feet above the water, and there is a fine view of the entire expanse of the Golden Gate, Fort Point, the Marin shore, etc. The terminus of the road will be near the upper gate of Mr. Sutro's park.

Two new routes were submitted this week to the New York Rapid Transit Commission, one for an elevated road and the other for a cable surface road. The first is to run from the foot of Broad street, through that street to Nassau, to City Hall Square, connecting there with the Brooklyn Bridge, thence through Centre to Marion, to Lafayette and Astor place, to Fourth avenue, to Twenty-third street, to Madison avenue, and through that avenue to Harlem Bridge, connecting with the New York Central at Mott Haven. The surface road is to start at Chambers street and run through Elm and thence in the most direct line to Lexington avenue, and up this avenue to the Harlem River, with branches to all the ferries on both sides of the city above Chambers street.

New York & Boston Rapid Transit.—A Boston dispatch says that a company of Boston and New York capitalists has been organized, with $1,000,000 capital, to purchase land on the line of this proposed road. Sixty-four thousand dollars worth is said to have been purchased in New York City.

New York, Chicago & St. Louis.—Articles of merger and consolidation have been filed between this company and the Erie & State Line Railroad Co. under the above name. The capital is $7,500,000.

New York City & Northern.—The road was sold on Aug. 17 in New York, under foreclosure proceedings, to Henry F. Dimock, for the Purchasing Committee, for $2,000,000. The road may be reorganized by the issue of $3,280,000 first mortgage bonds, $6,000,000 preferred and $3,000,000 common stock. No change in the relations of the road to the Manhattan is contemplated, and the sale does not make any serious change in the ownership. The road extends from High Bridge, N. Y., to Brewsters, 53 miles.

New York, Lake Erie & Western.—The company has just completed arrangements for making connection with the Pittsburgh & Western.

Northern Central.—The company has awarded contracts for new piers and warehouses at Canton, Md., aggregating about $200,000. The contract for building the piers has been awarded to Andrew Brown and J. F. Adams; for the warehouses and shedding, to Jones & Benner, and for dredging, to the American Dredging Co., Philadelphia. The piers are to be completed next spring.

Occidental Construction Co.—This company has filed its charter in Kansas, the object being to build railroads in that state. Capital stock, $1,000,000. Headquarters at Leroy, Kan.

Old Colony.—The bridges on this road are being inspected by Prof. G. F. Swain, of the Massachusetts Institute of Technology.

Omaha, Ness City & Mexico.—Charter filed in Kansas. The proposed road is to run diagonally through the state from the north line via Ness City and thence southwestward. Capital stock, $10,000,000.

Pacific.—The investigating committee are continuing their sessions in San Francisco. Lloyd Tevis, President of Wells, Fargo & Co., express, testified, as did also Leland Stanford.

The United States Circuit Court on Aug. 17 heard arguments in San Francisco on the right of Congress to inquire into the expenditures of the Central Pacific and Mr. Stanford's duty to answer the questions, but adjourned to Aug. 22 without deciding. D. O. Mills was examined by the commission on Wednesday.

Pittsburgh, Fort Wayne & Chicago.—The company is purchasing land along its line between Pittsburgh and Chicago, in preparation for the laying of a second main track.

Powells Valley.—The city of Knoville, Tenn., has voted to subscribe $275,000 to the stock of this company. The road is to be built from Knoxville, northward through Cumberland Gap to connect with the Louisville & Nashville, Norfolk & Western and other roads. Work begins this week, and the road is to be completed in 12 months.

Red River Construction.—This company has filed articles of incorporation at East Louis, Ill. Its object is to construct railroads and bridges in different States.

Rochester City & Brighton Terminal.—Incorporated in New York. Capital stock, $50,000.

St. Joseph & Santa Fe.—The company has recently filed articles in Missouri, and will build a standard gauge road from a point in Buchanan County, opposite Atchison to a junction with the Chicago, Santa Fe & California in Carroll County. The road will be 97 miles long and will pass through Buchanan, Dekalb, Clinton, Caldwell, Ray and Carron.

St. Louis Bridge & Tunnel.—The Missouri Pacific and the Wabash, which jointly control this bridge and road, are negotiating with the roads terminating at East St. Louis with a view to getting them to join in the lease and of placing the operation of the bridge on such a basis as will make the terminus of the latter roads practically at St. Louis instead of East St. Louis, and greatly simplify the billing of freight and ticketing of passengers.

St. Paul, Alexandria, Jennings, Lake Arthur & Gulf.—Organized to build a road from Alexandria, La., south to Jennings, about 150 miles.

St. Paul, Minneapolis & Manitoba.—The company has commenced work on a new road from Wahpeton and Breckenridge, Dak., southwest to Rutland Junction.

Seattle & Eastern.—Two cargoes of steel rails from England have just arrived at Seattle, Wash. Ter., and will be immediately laid on the 20 miles of this road which is now graded.

Somerset.—The company proposes to begin work on the bridge across the Carrabassett River at North Anson, Me., as soon as the branch road is built to Dodlin hill. The road will be built to Solon this fall, and to Bingham early in the summer.

Southern Pacific.—The company has its track laid through Santa Barbara, Cal., and it will be extended at once from that point northly to San Luis Obispo.

A survey is in progress from the terminus of the Visalia & Goschen road at Visalia, Cal., eastward to the route recently surveyed from Sycamore, Fresno County. The junction will be about 8 miles east of Visalia.

State Run.—This road was graded in 1885, and nearly all the track laid during the summer of 1886. It is owned and built by J. B. Weed & Co., large tanners, of Binghamton, N. Y., for hauling lumber and bark. It starts from State Run, Pa., on Pine Creek, and ascends the mountain 6¼ miles, and rises 1,205 ft. Two miles of this has a grade of 396 ft. to the mile, with 10 and 12 degree curves, 30-lb. steel rail, and 3 ft. gauge.

Tennessee Midland.—The engineering corps is to at once survey a new route from the Cincinnati Southern road to the Virginia state line. The new survey will follow the Clinch Valley and will leave Knoxville, Tenn., on the other side by about 20 miles.

Toledo, Peoria & Western.—This company has applied to the New York Stock Exchange to have $5,000,000 4 per cent. first mortgage bonds and $4,500,000 common stock placed on the list.

It is predicted that the damages resulting from the Chatsworth disaster will bankrupt the road. It has already passed through two reorganizations.

Tuscaloosa Northern.—The contract for grading the first 10 miles of this road has been let to Robert Squire & Co., of Birmingham, Ala.

West Virginia Central.—The company has lately been making a rock cut at Westernport, Pa., in order to secure connection with the Cumberland & Pennsylvania at that point. The latter company opposes the connection, and has taken active measures to prevent it. It is likely that the matter will get into the courts unless compromised.

Wheeling & Lake Erie.—The road is to be extended from Bowerstown, O., its present southern terminus, to Wheeling, W. Va., a distance of 44 miles.

Winters & Ukiah.—Incorporated of the interest of the Central Pacific to build a branch of the latter between Winters and Ukiah, Cal., 105 miles. Capital, $4,000,000.

TRAFFIC AND EARNINGS.

Coal.

Coal tonnages for the week ending Aug. 13 are reported as follows:

	1887.	1886.	Inc. or Dec.	P.c.
Anthracite	714,926	694,093	I. 20,833	3.1
Bituminous	258,786	228,643	I. 30,143	13.1

Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Month of July:	1887.	1886.	Inc. or Dec.	P. c.
Atch., T. & S. F.	1,528,823	1,303,110	I. 225,713	17.3
Atlantic & Pac.	189,737	116,857	I. 72,880	62.3
Buff., N. Y. & P.	244,200	245,709	D. 1,509	.6
Buff., R. & Pitts.	173,356	123,328	I. 50,028	40.5
*Bur., C. R. & No.	136,630	139,753	D. 3,123	2 2
Cairo, V. & C.	63,353	70,507	D. 7,154	10.1
California South.	101,946	59,511	I. 42,435	71.3
Canadian Pac.	1,051,000	998,348	I. 56,652	5.6
Cape F. & Y. V.	19,309	14,542	I. 4,767	32.8
Central of Iowa.	99,319	99,956	D. 637	...
Chi & Atlantic	182,608	130,019	I. 52,589	40.3
Chi. & East. Ill.	167,209	141,249	I. 25,960	18.3
Chi., Mil. & St. P.	1,846,000	2,036,726	D. 190,726	9.3
C., St. L. & P.	487,016	401,680	I. 85,336	21.1
Chi. & W. Mich.	113,344	116,259	D. 2,915	2.5
C., I., St. L. & C.	209,938	213,631	D. 3,693	1.7
Cin., J. & Mack.	40,789	37,484	I. 3,305	8 8
Cin., N. O. & T. P.	269,100	259,700	I. 9,400	3.6
Ala. Gt. South.	116,000	82,664	I. 33,336	40.3
N. Orl. & N. E.	43,200	36,400	I. 6,800	18 5
Vicks. & Mer.	34,300	31,600	I. 2,700	8.5
Vicks., Shre. & P.	33,300	30,860	I. 2,440	7.8
Cin., R. & Ft. W.	31,260	33,028	D. 1,768	5.3
Cin., W. & Balt.	177,177	150,820	I. 26,357	10.8
Cleve., Ak. & Col.	48,844	48,387	I. 457	1.1
Cleve. & Marietta	19,774	22,370	D. 2,596	11 5
Col. & Cin. Mid.	27,568	30,211	D. 2,643	8.7
Col., H. Vy. & Tol.	206,481	198,116	I. 8,365	4.2
D., Ft. W. & Chi.	25,563	11,272	I. 14,291	126.4
Den. & R. G.	672,500	610,082	I. 62,418	10.2
Den. & R. G. W.	97,500	85,742	I. 11,758	13.7
Det., B. C. & Al.	50,883	22,432	I. 28,451	127 0
Det., Lan. & No.	83,887	102,613	D. 18,726	18.2
E. Ten., Va. & G.	411,171	331,046	I. 80,125	24.2
Ev. & Ind	20,088	21,876	D. 1,788	8.1
Ev. & Terre H.	76,090	84,531	D. 8,441	9.9
Flint & P. M.	223,434	179,730	I. 42,704	23.7
Fla. Ry. & N. C.	72,337	65,249	I. 7,088	10.8
Ft. W. & Den. C.	68,494	34,671	I. 33,823	97.4
Gr. Rapids & I.	223,763	200,723	I. 23,040	11.4
†Grand Tr. of Can.	1,443,119	1,335,241	I. 107,878	8.0
Gulf, Col. & S. F.	209,087	190,443	I. 18,644	9.7
Houston & T. C.	191,505	174,916	I. 16,589	9.4
Ill. Cen. (Ill. Div.)	585,451	588,438	D. 2,987	.5
South. Div.	255,300	257,100	D. 1,200	.4
Cedar Falls & M.	10,200	13,079	D. 2,879	21.9
Dub. & Sioux C.	63,318	66,034	D. 2,716	4.1
Iowa F. & S. City	50,500	44,542	I. 5,958	13.3
Ind., Bloom. & W.	228,281	218,240	I. 10,041	4 6
Ind., Dec. & Spr.	38,480	39,915	D. 1,435	3.5
*K. C., Ft. S. & G.	136,992	110,731	I. 26,261	23.7
K. C., Spr. & M.	108,833	67,411	I. 41,422	61.4
*K. C., Clint. & S.	11,429	12,649	D. 1,220	9.6
Keokuk & West.	23,454	21,290	I. 2,164	10.1
Kingston & Pem.	15,545	11,325	I. 4,220	37.3
Lake Erie & W.	170,465	155,536	I. 14,929	9.6
Lehigh & H. R.	22,019	16,421	I. 5,598	34.1
Long Island	419,718	391,661	I. 28,057	7.1
Lou., Ev. & St. L.	77,643	71,631	I. 6,012	8 3
Louis. & Nash.	1,310,685	1,259,774	I. 50,911	3.9
Louis., N. A. & C.	196,882	17,460	I. 26,422	15 4
L., N. O. & Tex.	109,722	105,454	I. 4,268	4.0
Mar., Col & Nor.	7,216	2,511	I. 4,705	188.2
Marq., H. & O.	160,397	139,543	I. 20,854	14 2
Memphis & Chas.	128,828	95,463	I. 32,365	33.8
‡Mexican Central.	372,000	276,538	I. 95,462	30.9
Mil., L. S. & W.	315,689	248,944	I. 67,245	27.0
Mil. & Northern.	73,812	52,822	I. 20,990	39.1
Minn. & North. W.	99,744	44,632	I. 55,112	123.3
Mobile & Ohio	170,891	155,027	I. 15,864	10.2
Nash., C. & St. L.	258,877	215,256	I. 43,621	20.2
N. Y. C. & H. R.	2,779,198	2,677,628	I. 101,572	3.8
†N. Y. City & No.	47,364	44,660	I. 2,704	6.4
N. Y., Ont. & W.	149,879	144,331	I. 5,548	3.8
Norfolk & West.	302,308	237,256	I. 65,052	27.4
Northern Pacific.	1,172,408	1,100,026	I. 72,382	6.5
Ohio & Miss.	310,497	335,431	D. 24,934	7.4
Ohio Southern.	41,908	34,906	I. 7,002	20.0
Oregon R. & N. Co	405,300	421,881	D. 16,581	3.8
Peoria, Dec. & E.	66,433	73,343	D. 6,910	9 4
Pitts. & West.	171,190	145,091	I. 26,099	17.7
Rich. & Danville.	307,700	286,598	I. 21,102	7.3
Va. Mid. Div.	119,700	118,100	I. 3,600	3.0
Chas., C. & A.	50,300	49,246	I. 1,054	2.1
Col. & Gr. Div.	32,000	28,219	I. 3,781	13 4
West. N. C. Div.	47,900	43,068	I. 4,832	11.2
Wa., O. & W.	9,500	9,600	D. 100	....
Ash. & Sp. Div.	6,200	3,400	I. 2,800	82 3
St. Jo. & Gr. I'd.	67,040	80,672	D. 13,632	16 8
St. L., A. & T. H.:				
Main Line	108,052	105,629	I. 2,423	2.3
Branches	68,345	67,183	I. 1,162	1.7
St. L., A. & Tex.	195,215	149,502	I. 45,713	30 6
St. L. & San F.	519,056	405,267	I. 113,789	28.0
St. P. & Duluth.	154,891	139,127	I. 15,764	11.3
St. P., M. & Man.	621,344	571,526	I. 49,818	8.7
Shenandoah Val.	73,000	66,000	I. 7,000	10.6
Staten I'd R. T.	122,090	118,604	I. 3,486	3.7
Texas Pacific	398,137	426,120	D. 27,983	6.5
Tol., A. A. & N. M.	44,357	29,465	I. 14,892	50.4
Tol. & Ohio Cen.	78,423	67,759	I. 10,664	15.7
Tol., P. & West.	73,287	66,953	I. 6,334	9 0
Valley (Ohio)	51,162	53,567	D. 2,405	4.4
Wabash (West.)	585,111	448,871	I. 136,240	30.3
Wheeling & L. E.	59,578	55,432	I. 4,146	7.4
Wisconsin Cent.	171,752	17,585	I. 54,167	307.7
Min., S. C. & W.	36,790	23,884	I. 13,106	54 8
Wis & Minn.	79,816	19,659	I. 60,157	305.3
Total	$26,482,244	$24,240,706	I. $2,241,538	....
			D. $350,301	..
Net			I. 1,891,237	7.7
Month of June:				
Allegheny Valley.	165,252	151,663	I. 13,589	8.9
Net	57,620	53,098	I. 4,522	8.5
Bur., C. R. & No.	217,446	218,124	D. 678	.3
Net	26,819	41,494	D. 14,675	35.3
Cape F. & Y. Vy.	17,984	14,723	I. 3,261	22.1
Net	7,490	5,063	I. 2,427	47.6
Ches. & Ohio	385,832	322,799	I. 63,033	19.5
Net	110,649	71,774	I. 38,875	54.1
Chi., Bur. & No.	202,637	.....	....	...
Net	56,255	.....	.....	....
Den. & R. G.	677,241	555,386	I. 121,855	21.9
Net	297,760	202,278	I. 95,482	47.1
L., N. O. & Tex.	111,822	101,679	I. 10,143	9 9
Net	10,047	15,780	D. 5,733	36.2
Ohio & Miss.	207,924	308,119	D. 10,195	3.3
Net	98,832	83,462	I. 15,370	18.4
Oreg. Imp. Co.	338,008	271,782	I. 66,226	24.3
Net	95,019	86,120	I. 8,899	10.3
Oreg. R. & N. Co.	444,731	481,735	D. 37,004	7.6
Net	214,572	240,014	D. 25,442	10.5
Rome, W. & Og.	271,965	232,101	I. 39,864	17.1
Net	117,491	89,618	I. 27,873	30.9
South. Pacific:				
Gal., H. & S. A.	215,713	201,966	I. 13,747	6.8
Net	34,785	Df. 2,909	I. 37,694	...
Louisv. & West.	65,718	48,710	I. 17,008	34.9
Net	31,259	21,333	I. 9,926	46.6
Morgan's La. & T.	295,023	262,560	I. 32,457	12.3
Net	60,655	10,556	I. 50,099	472 6
N.Y., Tex. & Mex.	11,774	12,438	D. 664	5.3
Net	Df. 674	352	D. 1,026	....
Tex. & N. Orl'ns.	99,105	80,081	I. 19,024	23 7
Net	44,753	34,571	I. 10,182	29.3
Tol. Atl. Sys.	687,333	605,760	I. 81,573	13.4
Net	170,778	63,902	I. 106,876	167.2
Tol. Pac. Sys.	2,199,928	1,985,969	I. 213,959	10.7
Net	1,082,759	1,024,540	I. 58,219	5.6
Total all lines.	2,887,260	2,591,729	I. 295,531	11.4
Net	1,253,536	1,088,442	I. 165,094	15.1
Five months—Jan. 1 to May 31:				
West Jersey and Branches	600,511	545,639	I. 54,872	10.0
Net	202,216	176,648	I. 25,568	14.4
Central Pacific.	4,715,503	4,368,098	I. 347,405	7.8
Net	2,021,010	2,239,897	D. 218,887	9.3
Southern Pac.	.....	.....	.....	....
No. Div. (Cal.).	631,672	482,791	I. 148,881	30.8
Net	257,126	196,995	I. 60,131	30.5
So. Div. (Cal.).	1,647,497	1,366,641	I. 280,856	20.5
Net	566,363	472,871	I. 93,492	19.7
Arizona Div.	705,318	662,834	I. 42,484	6.4
Net	302,005	323,647	D. 21,642	6.6
New Mex. Div.	310,510	296,487	I. 14,023	4.7
Net	141,282	158,379	D. 17,097	10.7
Six months—Jan. 1 to June 30:				
Allegh. Val.	944,431	836,518	I. 107,913	12.9
Net	340 324	294,848	I. 45,476	15.4
Bur., C. R. & No.	1,372,471	1,265,633	I. 106,838	8.4
Net	379,702	288,732	I. 30 970	16.7
Cape F. & Y. Vy.	123,468	104,874	I. 18,594	17.7
Net	57,460	52,404	I. 5,056	9.6
Ches. & Ohio.	2,060,111	1,819,818	I. 240,293	13.2
Net	597,803	503 719	I. 94,084	18.6
Chi., Bur & No.	1,270 285	.. ....	.....	....
Net	331,575	... .	.....	....
Den. & R. G.	3,555,537	2,879 942	I. 675,595	23.4
Net	1,398 306	946,778	I. 451,528	47.6
Lou., N. O. & F.	920,794	731,477	I. 189 317	25.8
Net	229,866	132,373	I. 97,493	73.6
Ohio & Miss.	1,891,324	1,730,720	I. 160,604	9.3
Net	611,802	423,957	I. 187,845	44.0
Ore. Imp. Co.	1,804,402	1,239,521	I. 564,881	45.5
Net	429,524	219,299	I. 210,225	95.7
Oreg. R. & N. Co.	2,280,909	2,331,313	D. 50,404	2.1
Net	895,804	927,790	D. 31,986	3.4
Rome, W. & Og.	1,382,865	1,246,854	I. 136,011	16.9
Net	537,234	462,752	I. 74,482	15.9
South Pacific:				
G., H. & S. Ant.	1,588,983	1,233,339	I. 355 644	28.8
Net	200,640	88,650	I. 111,990	126.2
Louis & West	381.876	300,465	I. 81.411	27.0
Net	168,811	144,018	I. 24,793	17.2
Morgan's La. & T.	1,942,019	1,968,824	D. 26,805	1.3
Net	301.293	442,316	D. 141,023	31.8
N. Y., Tex. & M.	82,516	64,931	I. 17,585	27.0
Net	2,362	Df. 10.665	I. 13,027	....
Tex & New Orl.	579,124	450,949	I. 128,175	28.4
Net	249,579	182,137	I. 67,442	39.0
Total Atl. Sys.	4,544,119	4,022,298	I. 522,261	12.9
Net	922,686	845,712	I. 76,974	9.1
Total Pac. Sys.	11,772,696	10,736,108	I. 1,036.588	9 6
Net	5,172,607	5,316,342	D. 144 335	2.4
Total all lines.	16,317,213	14,758,366	I. 1,558,847	10.5
Net	6,094,693	6,162,054	D. 67,361	1.0

*Includes but three weeks of July in each year.
†For four weeks ended July 30. ‡Mexican Currency.

The Inter-state Commission.

The East Tennessee Railway (East Tennessee, Virginia & Georgia ?), in replying to a complaint of Heck & Petres, coal miners, that they are denied cars to load, makes the novel plea that the complainant is instigated by his uncle who has a grudge against the defendant road! As for the alleged offense itself no defense appears to be offered, so far as the dispatches state. It would appear that the coal mines are on the line of another road, that the East Tennessee lets cars to this other road, but forbids their being used except for a certain distance from the junction.

The New York, Philadelphia & Norfolk road complains that the companies comprising the Atlantic coast line refuse to make through rates to Baltimore, Philadelphia and New York with it, and to afford facilities for the interchange of traffic, while they do make such through rates with and afford facilities to other companies competing with complainant.

The Lake Shore & Michigan Southern has been given until Sept. 5 in which to reply to the complaint of the Boston Chamber of Commerce.

Cotton.

The cotton movement for the week ending Aug. 12 is reported as below, in bales:

Interior markets:	1887.	1886.	Inc. or Dec.	P. c.
Receipts	7,279	7,536	D. 257	3.4
Shipments	9,330	8,624	I. 706	8.2
Stock	23,967	48,719	D. 24,752	50.8
Seaports:				
Receipts	7,270	6,660	I. 610	9.1
Exports	12,521	12,957	D. 436	3.3
Stock	136,201	205,572	D. 69,371	33.7

Total movement from plantations for the crop year ending Aug. 12 was 6,369,235 bales, against 6,476,560 for last year, 5,616,570 in 1884–85, and 5,649,898 in 1883–84.

East-bound Shipments.

The shipments of all freight except live stock from Chicago eastward to seaboard points for the week ending Aug. 13, amounted to 16,416 tons, against 20,067 tons for the previous week. This is the smallest showing made in any one week in several years. The percentages carried by the different roads were: Chicago & Grand Trunk, 12.1; Michigan Central, 18.8; Lake Shore & Michigan Southern, 16.2; Pittsburgh, Fort Wayne & Chicago, 19.1; Chicago, St. Louis & Pittsburgh, 15.5; Baltimore & Ohio, 9.7; New York, Chicago & St. Louis, 8.4; Cincinnati, Indianapolis, St. Louis & Chicago, 0.2.

Local Freight Rates in Nebraska.

The Nebraska Railroad Commissioners have forwarded to the different roads in the state comparative tables of local freight rates in Nebraska, Iowa and Minnesota, showing that local rates in Nebraska are 20 per cent. higher than in the other states. The board demands that the roads in the state reduce their rates.

Division of the Extra Baggage Revenue.

The Western States Passenger Association and the Southern Passenger Association have mutually agreed to report excess baggage collections on the basis of divisions of ticket rates.

Central Traffic Association.

The passenger agents' meeting at Mackinac, Aug. 10, was a failure, the attendance being so small that the chief business done was the toning up of the members' physical systems by the inhalation of large quantities of the invigorating air of that region.

Mileage Tickets.

The rule, in full, concerning mileage tickets adopted by the Western States Passenger Association is as follows:

"Mileage tickets may be sold and shall be restricted to use by one person only, who shall be named thereon, and they shall be sold at an uniform rate of 2½ cents per mile without rebate. Each ticket shall be good for 1,000 miles, no more nor less, and shall be limited to one year from date of sale. The free-baggage allowance on mileage tickets shall be the same as on local tickets, namely, 150 pounds. No mileage ticket, or any portion thereof, shall be transferred from the original purchaser to any other person, but unused portions of mileage tickets may be redeemed or accepted from the original purchasers in part payment for new tickets, after deducting 3 cents per mile for the portion used."